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ABSTRACT

Four commissioned papers prepared for a conference on key concepts in the areas of economic productivity and adaptability in the Northeastern states are presented in this document. These papers reflect an important fact: that major socioeconomic changes are underway that will affect the ability of Northeastern states to maintain productive and sustainable rural economies. The papers also address the challenges and opportunities for research and extension linkages with a focus on ameliorating problems and taking advantage of potential opportunities. The first paper, "Economic, Social and Environmental Impacts of Economic Development Distribution" (Thomas Lyson), focuses on the changes in economic activity in rural areas, and the need for rural restructuring. This paper contains several tables and maps showing the changes in economic activity in recent years. The next paper, entitled "Fiscal Impacts of Economic Changes on the Revenues and Expenditures of Rural Local Governments and Communities" (Farhad Atash) reviews past literature on these impacts. The third paper, "Economic and Social Outcomes of Public and Private Investments in Physical Infrastructure for Growth and Stability of Rural Economies" (Steven Deller), reviews studies that examine the link between investment in economic and social overhead capital, and economic development and growth. The last paper, called "The Key Factors in the Community's Social and Physical Environment That Enhance Sustainable Local Economic Activity" (Frank Goode & Ganesh Rauniyar), identifies the type of information system necessary to deal effectively with sustainable economic activity in rural development efforts. Each paper contains numerous references. (KS)

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ECONOMIC PRODUCTIVITY ADAPTABILITY

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ECONOMIC PRODUCTIVITY and ADAPTABILITY:

**Four State-of-the-Art Papers on Highest
Research-Extension Priorities within the
twelve states and D.C. Northeast Region**

April 1991

**The Northeast Regional Center
for Rural Development
104 Weaver Building
University Park, PA 16802**

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FOREWORD

The Economic Productivity and Adaptability Issue Working Group formed for the Morgantown, West Virginia Key Issues Conference was the first to request commissioned papers on state-of-the-art issues in the four highest research priority areas identified under this topic. The group's recommendation was approved by the Northeast Regional Center for Rural Development Board of Directors. The commissioning process was the next step.

In addition to giving impetus to the idea of such papers, the working group also identified four colleagues from within the Northeast region who were highly qualified to author papers that would reflect the state-of-the-art in each of these four highest priority areas. The papers that resulted reflect an important fact: major socio-economic changes are underway that will affect the ability of Northeastern states to maintain productive and sustainable rural economies. Rural economies face particular problems in adapting to these changes because of the communities' small size, geographic isolation, low population density, lack of employment diversification, and traditional dependence on natural resource-based industries and routine manufacturing. We asked the authors to go further and addressed the challenges and opportunities for research and extension linkages. Each in his own style met both aspects of the "charge." The authors have suggested research and extension activities focused on ameliorating problems and taking advantage of potential opportunities. Finally, these papers will help public and private decision makers adjust to changes in innovative, flexible, and creative ways.

Combined, these papers form a significant portion of the key concerns in the issue of economic productivity and adaptability. The authors and their papers in order of presentation are as follows:

- | | |
|----------------|---|
| Thomas Lyson: | "Economic, Social and Environmental Impact of Economic Development Distribution" |
| Farhad Atash: | "Fiscal Impacts of Economic Changes on the Revenues and Expenditures of Rural Local Governments and Communities" |
| Steven Deller: | "Economic and Social Outcomes of Public and Private Investments in Physical Infrastructure for Growth and Stability of Rural Economies" |
| Frank Goode: | "The Key Factors in the Community's Social and Physical Environment That Enhance Sustainable Local Economic Activity" |

The papers are intended as bench marks for the purposes of generating discussion, setting forth research-extension proposals, and dealing with their significant areas of Economic Productivity and Adaptability. The task of follow-up is the responsibility of all of us.

Daryl Heasley, Ph.D., CCD
Director

ECONOMIC, SOCIAL AND ENVIRONMENTAL IMPACTS OF ECONOMIC DEVELOPMENT DISTRIBUTION

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ABSTRACT

Today, the social and economic fabric of rural America is being rewoven in response to technological innovations in agriculture, changes in corporate investment strategies, and state and local development initiatives. Perhaps no term better describes the changes taking place than "rural restructuring." The diversity of conditions across rural America, however, means that rural restructuring has taken different forms in different regions of the country.

Rural areas of the South, for example, have seen the quality of life and standard of living of their residents deteriorate relative to urban places during the 1980s (Lyson, 1989; Falk and Lyson, 1988). The declining fortunes of the rural South are due in part to the loss of manufacturing plants to Third World countries. Throughout the 1960s and 1970s southern communities offered lucrative packages of business incentives in an effort to attract and keep branch plants of large national and multinational corporations. This strategy of smokestack chasing proved less effective during the last decade as southern communities found that they could not compete with the Third World where wages are lower, workers less organized, and inducements more lucrative than those found in the American South (Rosenfeld, Bergmar, and Rubin, 1985).

Other regions, like the Midwest, experienced a severe downturn in the farm economy during the past decade. This resulted in large numbers of agricultural producers going out of business and a further consolidation of remaining farms into larger and larger units (Otto, 1986; Ginder et. al., 1986). One consequence of the farm crisis of the mid-1980s was that farm-dependent communities in many midwestern states saw their population bases erode. Since then they have been unable to sustain even a minimal level of services. While many of these places are trying to find innovative ways of nurturing and sustaining

economic development, the prospects for a return to prosperity in the 1990s do not seem especially promising (Johnson, 1988).

In the Northeast, the rural restructuring process has four components. First, it implies changes in the extractive sector of the economy. There has been and will continue to be a relative decline in the importance of production agriculture as a source of livelihood and jobs for rural residents. Likewise, mining-related employment in the region is likely to continue its long-term decline.

Conversely, as the number of farms continues to dwindle and as employment in the mining industry diminishes, the forest products and timber industry is emerging as an increasingly important component of the extractive sector of the rural economy in the Northeast (Lyson and Hirschl, 1990).

The second component of rural restructuring in the Northeast manifests itself in a shift in the types of manufacturing activities and the closing or downsizing of many large manufacturing plants in the region. Third, off-setting the loss of jobs in large manufacturing establishments is the emergence of small-scale, innovative and what have been called "flexibly specialized" manufacturing enterprises in many parts of the rural Northeast. Finally, rural restructuring can be seen in the growth of service-sector employment in virtually all areas of the region.

Conceptual Underpinnings of Rural Restructuring

Most theoretical explanations for the restructuring process rest on some variation of the export-base or economic-base model of economic development (Kale, 1989). Export-base models of development can be characterized as "demand-side" explanations of economic change. In formal models of the development process, demand factors consist of private sector demand originating outside of the local economy (e.g., community, region, country) and of income injections through public sector purchases such as defense spending and transfer payments such as social security. The direct and indirect effects of these demand-side factors are estimated through multiplier relationships between basic and non-basic sectors. This means that for every job created in an export-base industry like manufacturing or agriculture, other jobs are created in the non-export sector of the

economy. Norton (1987), for example, recently noted that the multiplier for factory jobs in the Northeast is two.

From this perspective, the restructuring of the rural economy in the Northeast can be seen as a reaction to changes in the national and global economy that have affected the markets for manufactured goods produced in the region. Viewed historically and placed within the product cycle theory of industrial location, the changes that have taken place in the region are part of a predictable cycle of economic expansion and contraction. According to Syron and Brown (1989: xi), the Northeast has always grown by "...fits and starts, advancing rapidly and achieving high levels of prosperity when key industries were in an expansive phase and losing ground as growth in these lead sectors subsided." In the 1950s, for example, durable goods manufacturing replaced textiles as one of the economic engines in the region. During the 1960s aerospace and instruments helped spur another era of growth. In the 1970s and 1980s computer-related activities and certain export-type producer services played a prominent role. It is unclear what the new export base will be in the region in the 1990s, but many observers point to knowledge-intensive industries such as computer software and other technologically driven companies as prime candidates (Canton and Koenig, 1990).

While most theories of regional change and development have typically been grounded in a demand-side framework and hence focused on the composition of the economic base of the region, increased attention has been directed to the supply-side of the equation during the last decade (Thornburgh, 1988; Hansen, 1988). Supply-side factors include programs to enhance the human capital of the labor force to make it more productive, income-tax reductions to increase incentives to work, and investments in infrastructure to make labor and resources more productive (Nelson, 1989).

Over the short run, changes in a region's economic base will likely have more dramatic effects on the social and economic status of local communities and workers than supply-side initiatives. The nature and range of employment opportunities in the rural Northeast and in other regions are sensitive not only to the inter regional shifts of manufacturing plants within the U.S., but to shifts in the new international economy as well.(Forrer, 1988; Dertouszous, 1989; Canton and Koenig, 1990). Ultimately, however, the ability of regional or local economies to prosper is dependent upon their productivity relative to other regions and localities. Factors related to greater productivity such as

education, technical training, and infrastructure are, of course, supply-side factors. Unlike changes in the export base of a region that can occur quickly, there can be a long time lag between investment in supply-side factors that enhance productivity and the payoffs from these benefits (Hansen, 1988; Nelson, 1989).

The "New Economy": The Role of Small Business in Revitalizing Rural America

One area in which supply-side investments show promise for the 1990s is small business development (Malecki, 1988). Recent data from the Small Business Administration show that the rate of job growth is higher for small businesses than large businesses in rural areas. This reverses a long-standing trend for rural America, where branch plants of large corporations accounted for the bulk of new jobs (Lonsdale and Seyler, 1979).

In recent years, several researchers have begun to enumerate both the benefits and costs of small business development as an engine of rural and regional economic growth (Allen and Hayward, 1990; Andre, 1989; Birch, 1987; Lin, Buss and Popovich, 1990). Fisher (1989), for example, notes that small businesses are more likely to have positive social and economic linkages to the local community than large establishments. This point was made over 40 years ago by Walter Goldschmidt (1946) in his study of corporate and family farming communities in California, but is frequently overlooked today.

This is not to say that the New Economy is without vulnerabilities (O'Farrell and Hitchens, 1988). At least some growth in the small business sector is an artifact of a recent trend toward subcontracting of various manufacturing and/or service functions by large corporations. For example, rather than maintain its janitorial and custodial staff, a large corporation may find it advantageous to purchase these services on the open market. This means that the ability of small firms to grow and diversify may be limited by contractual obligations to larger corporations.

Furthermore, by limiting a small establishment's degrees of freedom to operate, the small business is subjected to the same market vagaries as the large corporation. Beyond

this, there is some evidence that many small businesses pay lower wages and offer fewer fringe benefits than large establishments (Gordon, 1979; Fisher, 1989).

Despite these caveats, however, there may be considerable payoff to the establishment and nurturing of small business. Birch (1987) has noted that between 1980 and 1986, the Fortune 500 companies reduced their work forces by 2.8 million people. At the same time, one million new jobs were added to the economy. Many small businesses represent the leading edge of technological development in the product cycle. Rural areas that can provide the infrastructure, venture capital, and skilled labor for these small businesses are likely to outperform the economy as a whole (Johnson, 1989).

Where Does The Service Sector Fit?

It is widely agreed that rural and regional economic development is primarily driven by goods producing (or basic) industries. However, as employment in the services sector has burgeoned and manufacturing has stagnated, increasing attention has been paid to how non-goods producing enterprises can contribute to economic development. Generally speaking, non-basic (or services) activities are organized to meet the needs of local consumers and to provide support for the export-base enterprises in an area. However, some producer and consumer services, especially those related to information and data processing, can serve as autonomous export-base platforms (Groshen, 1987; Norton, 1987; Gillespie and Williams, 1988).

Currently in the United States, rural areas attract their share of population-based services (i.e., those that meet the needs of the local residents such as restaurants, banks, gas stations, etc.). Furthermore, a few rural areas have captured an export-base type service operation such as the credit card operation of a large bank or the data-processing tasks of a large corporation and the like (Smith, 1988). In a comprehensive review of the literature, Glasmeier and Borchard (1989) note, however, that most of the export-base service growth in rural America is taking place in counties adjacent to metropolitan areas and not in more remote places. Additionally, they found that the jobs associated with these types of operations are typically low skill and low paying. The higher skilled, better paying services jobs (i.e., those associated with computer software development, engineering design, etc.) are still found in urban areas.

Despite the current situation, Miller and Bluestone (1988) note that the potential exists for a "filtering down" of service activities from urban to rural areas, much like manufacturing activities filter down to places where labor costs are lower (Thompson, 1965). Improvements in communications, transportation, and new information technology may mean that information delivery services could move into rural areas in the near future. However, these authors acknowledge that rural areas might be better served by developing "specialized" services in areas related to tourism, retirement, and other sectors where a comparative advantage could be developed.

Consequences of Rural Restructuring for Workers and Communities

The process of rural restructuring taking place in the Northeast is resulting in sweeping changes in population distribution, the industrial and occupational structure of the region, and the distribution of socioeconomic benefits. Both workers and communities have been differentially affected by these changes. Some people and places have seen their standard of living and quality of life rise as the restructuring process has played itself out, while others have seen conditions deteriorate.

One of the most fundamental changes associated with restructuring is population change. While the Northeast as a whole experienced a small increase in population during the past decade, nonmetropolitan counties displayed a varied pattern of population change (Beale and Fuguitt, 1990). There was a net in-migration in the rural counties along the Maine Coast. Likewise, most non-metro counties in Vermont and New Hampshire experienced net in-migration. Finally, the peri-urban areas around Boston, New York City, and the Philadelphia-Baltimore-Washington corridor saw an influx of migrants. Rural communities in all of these areas have had to contend with rising taxes, land speculation, and increased pressure on existing services and infrastructure (Baker, 1988).

Offsetting these increases, out-migration was the norm in northern Maine, northern New York, western New York, northwestern Pennsylvania, and virtually all of West Virginia. As villages lose population, they also lose retail and services establishments (Johansen and Fuguitt, 1990). The tax base erodes, young people leave the area to find work, and the provision of essential services is often threatened (Kunstler, 1990).

Most of what we know about the social and economic impacts of rural restructuring has come from case studies of communities, counties, and labor market areas. During the 1960s and 1970s, attention was directed toward understanding how new manufacturing enterprises created jobs and economic opportunities for rural communities. Summers et. al. (1976), for example, listed 31 empirical generalizations from their study of 186 case studies of industrial location. As might be expected, they noted both positive and negative impacts; however, on balance, industrial development was viewed in a positive light.

While earlier work focused on what happens to communities and workers when a manufacturing plant moves into a rural area, more recent research has begun to look at the social and economic consequences of rural restructuring. Toward this end, Killian and Hady (1988) note that diversified rural economies perform better than specialized economies on a wide range of indicators including per capita income, unemployment, income growth, income stability, employment growth and employment stability. Similarly, an economy organized around small scale enterprises has many positive and beneficial effects. Small business are more likely to be locally owned and operated than large businesses. As Fisher (1989: 134) notes in this regard: "If the goals of economic development policy include maximizing the recirculation of profits within the local economy and minimizing capital shifts out of the community, local ownership should contribute to both objectives." Along this same line, a small business strategy may be an effective way to "diversify" local economies and hence make communities and workers less subject to the instability of the business cycle (Lin, Buss and Popovich, 1990).

Other studies have shown that the decline of agriculture and export-base manufacturing is related to a general decline in income and living standards among rural residents. Furthermore, the growth of the services sector as a source of jobs and livelihood in rural communities can further erode economic conditions. Porterfield (1990) examined industries in the Northeast that gained and lost jobs between 1981 and 1986. She found that the industries that added the most jobs were eating and drinking establishments, grocery stores and nursing homes and that all of them could be characterized as "low wage." On the other hand, the industries that lost the most jobs in the region during this period included computer and office machine manufacturing, metalworking machinery, and construction and these were all "high wage" industries. Overall, Porterfield concludes that a loss of middle-class or middle-income jobs has occurred in the region. Bluestone and

Harrison (1988) make the same point in their book, The Great U-Turn (see also Uchitelee, 1990).

The most recent literature on economic restructuring and prospects for development in the Northeast suggest that the region may be heading for a sustained period of economic hardship (Jenks, 1990). There were nearly twice as many business failures in 1990 as in 1989 in the region. The engines behind the economic growth of the 1980s--high-tech manufacturing, finance and construction--have run out of steam. Virtually every state in the Northeast is projecting a record budget deficit (Hinds, 1990). The effects of these economic jolts are now being felt in the form of rising unemployment and underemployment, curtailed social services, and other social disruptions.

Rural Restructuring in the Northeast: Some Exploratory Findings

The literature reviewed in the preceding sections of the paper has served to identify some of the key dimensions associated with rural restructuring in the United States and some of the social and economic consequences for workers and communities. In the next sections, I draw on findings from several on-going research projects at Cornell University and examine how rural restructuring manifests itself in the Northeast.¹ Special attention is paid to how the restructuring process varies within the region itself. Given the diversity in economic situations, environmental conditions, infrastructure capacity, and human capital across the 300 counties and 12 states that comprise the Northeast region, one can expect to find significant intra-regional differences in the reactions of rural communities and counties to the large-scale macro forces reshaping the region as a whole.

The Restructuring of The Extractive Sector

Although the Northeast has not been considered a major agricultural region for over a century, it would be a mistake to underestimate the importance of farming to the economic base of many counties and communities. In 1987, there were still 158,461 farm businesses in the region that generated over \$9.3 billion in sales. There are 39 counties in which per capita farm sales exceed \$1,000 and another 51 counties in which this figure exceeds \$500. Among the 146 nonmetropolitan counties in the region, there are 36 counties

in which farm sales exceed manufacturing sales and another 12 counties in which farm sales are at least 50 percent of manufacturing sales (Map 1).

Traditionally, production agriculture in the Northeast has been dominated by dairy farming. Milk accounts for about 40 percent of the total value of agricultural production in the region. Both New York and Pennsylvania, for example, generate over \$1 billion in dairy farm sales yearly. Furthermore, there are 58 counties in the region where dairy sales exceed \$20 million annually and another 43 counties that generate between \$10 million and \$20 million a year in annual sales (Map 2).

Although the number of dairy farms has been declining for decades, there is reason to expect that farm numbers will begin to stabilize (Lyson and Geisler, 1991) as new technologies and production practices lead to an accelerated consolidation of dairy farms and a geographic concentration of milk production. At present, small scale dairy farming is dispersed over large proportions of the region with large pockets of dairy farms found in the western Southern Tier and the North Country of New York, Vermont, eastern Pennsylvania, and Maryland. However, over 700 farms in the Northeast have over 250 cows each; these large dairy farms are beginning to cluster in certain parts of the region. There are 10 New York counties that run geographically under Lake Ontario that account for over 20 percent of the large scale dairies in the region. At the same time, the number of small dairy farms has been decreasing in the traditional dairy areas of the Northeast. If these trends continue as expected, those rural areas in which small dairy farms predominate may find their economic bases seriously eroded. Given that the land used by dairy farms is unlikely to be converted to other agricultural purposes, it is likely that large portions of the region could revert back to forest land.

Another extractive enterprise in the Northeast that is critical to the economic base of many rural counties and communities is mining. Mining activity is primarily found in West Virginia and western Pennsylvania. It is no secret that the hey day of coal mining in the Northeast is long past. Advances in mining technology and the opening-up of coal fields in the West have caused mining employment in Pennsylvania and West Virginia to drop from 180,000 in the mid 1950s to about 70,000 today. Even during the 1980s, when other sectors of the economy experienced growth, the mining industry saw employment drop by nearly 45 percent.

This long term decline in mining has important implications for rural development efforts in West Virginia and parts of Pennsylvania. Over the years many mining-dependent communities have not been able to diversify their economic bases despite massive efforts by federal and state authorities to attract outside industry by subsidizing efforts to improve infrastructure (Raitz and Ulack, 1984). Compounding these problems is the fact that agriculture is generally not a viable economic activity in areas dominated by mining.

The one sector of the extractive industry that shows potential for growth and development of local economic bases is the timber and forest products industry. There are currently over 80 million acres of forest land in the Northeast, which represents one-fifth of the nation's industrial timberland. Most of this land is privately held. The primary forest products industry in the region employs over 80,000 people and ships products valued at over \$5 billion. This compares with gross sales from dairy farming that are under \$4 billion annually (Northeast Regional Council, 1987).

The economic development potential for forest products seems to be greatest in sparsely settled parts of the region. West Virginia and Maine, for example, have large tracts of exploitable timber land. Likewise, New York and Pennsylvania, the two largest states in the Northeast, have large timber areas.

The Decline of Large Scale Manufacturing

Although large-scale manufacturing enterprises were synonymous with the large urban centers of the country in the early part of this century, after World War II large national and multi-national corporations found rural areas hospitable places to build and operate plants. Taxes were generally lower in comparison to urban areas, the labor force was not as prone to unionization, and local governments were frequently willing to subsidize all sorts of infrastructure to make branch plants welcome. By the late 1970s nearly 500 manufacturing plants in the rural Northeast had 250 or more workers. Map 3 shows that these plants were concentrated in northern New England, the Twin-Tier region of New York, and Pennsylvania, and along the Maryland and Delaware coast. Few large manufacturing concerns were located in either West Virginia or the mountain areas of Pennsylvania, New York or Vermont. The number of large plants began to decline in the 1980s, however, as the branch plants of large corporations began to either "downsize" their

local operations or shift them out of the region to the sunbelt or the Third World. Between 1980 and 1986, for example, the rural Northeast lost over 100 large manufacturing concerns (those with over 250 workers). Map 4 shows the counties experienced a loss of two or more large manufacturing plants between 1980 and 1986. While 29 counties in the Northeast lost two or more plants, the rural counties of northwestern Pennsylvania were especially hard hit as were several rural counties in Maine.

Without painting too bleak a picture of the future for large-scale manufacturing as a leading component of the export-base in the rural Northeast, it appears that prospects for future growth of this type of economic enterprise are not especially auspicious. Clearly many large plants will continue to be the source of good jobs and good wages for rural workers. However, the engine that will propel economic growth in the 1990s for the rural Northeast probably lies with smaller enterprises are on the rise.

The Emergence of Small-Scale Manufacturing Enterprises

Although the era of large-scale manufacturing in the rural Northeast is on the wane, the number of small scale, home-grown manufacturing enterprises. These small manufacturing enterprises represent an important component of the New Economy. Between 1980 and 1986, for instance, the number of manufacturing establishments with under 20 workers increased by 16.1 percent. Of the 146 nonmetropolitan counties in the region, 111 experienced a rise in the number of small manufacturing establishments during this period. As Map 5 shows, all of the rural counties in Vermont, New Hampshire, Massachusetts, Delaware, and most counties in New York and Maine saw the number of small manufacturing concerns grow. The increase in the number of small manufacturing plants was less dramatic among the rural counties in West Virginia, Pennsylvania, and Maryland, though even in these states pockets of growth occurred. Overall, by 1986 there were over 6,200 small manufacturing establishments in the rural Northeast.

There is another instructive way to approach the importance of small manufacturing to rural economies in the Northeast. Map 6 illustrates the density of small manufacturing in the 146 nonmetropolitan counties in the region. Clearly, northern New England has more small manufacturing establishments per capita than other parts of the region. This is not surprising given that this part of the Northeast region has several fundamental

ingredients necessary to nurture and develop this type of economic enterprise. First, educational levels and support for public education is generally higher in the New England states than in other parts of the rural Northeast. Second, the entrepreneurial climate benefits from the proximity to major seedbeds of new technology and ideas, such as Boston, Massachusetts. Finally, the infrastructure of roads, highways, airports and telecommunications facilities is well developed in the New England region (Norton, 1987).

Service Sector Employment

The service sector provides the bulk of jobs in both rural and urban areas of the region. Furthermore, in the coming years virtually all new job growth is likely to be services related. It is important to remember, however, that the services economy is very heterogeneous. It contains enterprises with highly skilled, technologically sophisticated jobs as well as enterprises dominated by low paying, dead-end employment (Singelmann, 1978). The services sector is frequently broken down into four broad categories of activities: (1) distributive services (i.e., transportation, communication, wholesale and retail trade); (2) producer services (i.e., banking, insurance, engineering, accounting, etc.); (3) social services (i.e., hospitals, education, welfare, government, etc.); and (4) personal services (i.e., hotels, eating and drinking, entertainment, etc.).

From an economic development perspective, services activities that contribute to the export-base of a community offer considerable potential. Several researchers have noted the importance of producer services as a possible engine of economic growth in rural areas (Glasmeier and Borchard, 1989; Norton, 1987). Map 7 shows that the largest number of producer service establishments in the rural Northeast are found around the large metropolitan areas in the region. Thus, for example, the rural counties in the peri-urban areas outside of Boston, New York, and Pittsburgh have more producer service enterprises than more isolated rural areas in West Virginia, central Pennsylvania, and Northern New York and Vermont. Similarly, the percentage of the labor force employment in the producer service sector is highest around the large cities of the region and lower in the more remote places Map 9.

This spatial distribution of producer services is not particularly surprising. It is often important for these types of establishments to have close access to urban-based firms. With advances in communication technology, however, more isolated rural areas may be better positioned to compete for these types of activities in the years ahead (Bradshaw and Blakely, 1979).

Some Effects of Rural Restructuring in The Rural Northeast

Some of the social and economic consequences of restructuring for rural workers and communities in the Northeast are evident in Tables 1 and 2. These findings are derived from several on-going research projects designed to identify factors related to structural changes in the economy of the Northeast.

The data in Table 1 report changes between 1980 and 1988 in occupational and industrial employment patterns for workers living in nonmetropolitan counties. Especially noteworthy, though not particularly surprising, is the decline in manufacturing employment during the decade. In 1980, 34.4 percent of the men and 19.1 percent of the women held jobs in manufacturing plants. By 1988, only 26.0 percent of the men and 14.0 percent of the women were still employed in the manufacturing sector. The decline in the proportion of manufacturing jobs for men was offset by increases in the construction and services industries, while for women, the services sector expanded. The occupational data in Table 1 illustrate another dimension of the restructuring process. The percentage of the work force in operative/blue collar jobs dropped for both men and women. At the same time, the percentage of rural workers in service-related occupations increased. Economically, women did better than men during the 1980s. Table 2. Urban women saw their income rise by 27.9 percent, while rural women posted a 12.8 percent income gain. Urban men also saw their average incomes rise by 5.7 percent. However, despite the smaller percentage increase for urban men, they still earn over twice as much as urban women and nearly three times as much as rural women. Rural men also earn substantially more than urban and rural women, however, this cohort saw their average income drop by 11.6 percent between 1979 and 1987.

Finally, one other piece of information in Table 2 is noteworthy. The percentage of rural households with very low incomes (i.e., under \$10,000/year) increased from 12.6 percent in 1979 to 19.6 percent in 1987. During this same period, the proportion of rural households in the upper income category (over \$40,000/year) also increased. Taken together with the average income data, these findings lend support to the disappearing middle hypothesis put forth by Bluestone and Harrison (1988). The findings also suggest that rural restructuring in the Northeast is leading to greater inequality between rural and urban areas of the region and within rural areas themselves.

Where Do We Go From Here?

This paper has reviewed recent literature related to rural restructuring and its consequences for workers and communities. While some of the material reviewed in the first part of the paper pertained directly to the Northeast, most was either national in scope or focused on other regions. This is not surprising, perhaps, since the Northeast is the most "urban" of all the regions in the United States.

In an effort to broaden what is known about rural restructuring in the Northeast, the second half of the paper drew on several current state and regional research projects and presented some exploratory data on recent social and economic changes in nonmetropolitan areas of the region. This empirical overview of the restructuring process confirmed many of the findings from other studies and suggested several avenues for future research. First, from a development perspective, the Northeast clearly should not be treated as a uniform economic entity. There is probably as much social, economic, and environmental diversity within the region as between the Northeast and any other large geographic region. The data in Maps 1-7 illustrate this point. Consequently, studies related to economic development, industrial change, and local welfare are best undertaken at the community, county, or labor market level.

Second, notwithstanding the reemergence of small manufacturing and other entrepreneurial enterprises throughout the region, it is important to understand that the fate of rural communities is integrally tied to decisions made outside the region and even outside of the country. While several researchers have noted this fact (Hansen, 1988; Canton and Koenig, 1990), there is very little understanding, either empirically or

theoretically, about how these extra-local/global forces are played out on the local scene (Young and Lyson, 1991).

Third, the importance of economic diversity to the welfare of rural communities and workers is now being acknowledged. The growth of the small business sector is widely hailed as a sign that some rural communities can be revitalized. However, we lack an understanding of what "diversity" means. What mix of industries and how many different economic enterprises constitute a diverse set? We know that communities whose economic bases rest on one or two activities are more vulnerable to sharp upturns and downturns. However, we need empirical studies that focus on how different types of diversified economies fare over several business cycles.

Fourth, issues of equity within and between regions are seldom addressed. Rural restructuring has the potential to ameliorate or exacerbate inequities among workers and between and within communities. Linkages between restructuring processes and socioeconomic well-being must be established.

Fifth, while there are many dimensions along which nonmetropolitan counties in the Northeast can be classified, one promising way is to examine rural areas that are in proximity to the large metropolitan centers in the region and those that are more isolated. The popular media has identified both positive and negative effects to adjacent rural areas caused by the burgeoning growth of Boston, New York, and Baltimore-Washington. Clearly these growth centers have had an undeniable social, economic, political and environmental imprint on their peri-urban neighbors. As growth turns to stagnation and perhaps decline in these mega-urban places in the coming years, the ramifications are sure to be felt in the adjacent rural counties.

Finally, underlying most theoretical and empirical studies in this area is the assumption that over the long run the "free market" will most efficiently allocate resources (i.e., capital, labor, etc.) across space. This does not mean that rural communities cannot plan for and stimulate development. Rural communities will survive and prosper to the extent that they can develop and exploit a comparative advantage over other places.

Infrastructure, human capital, and forward looking leadership are prerequisites for successful economic development efforts. Renewed attention should be paid to the role of public-private partnerships needs.

Footnote

1. Most of the data presented in the maps and tables come from Cornell University Agricultural Experiment Station projects, Hatch 403, "The Changing Structure of Local Labor Markets in Nonmetropolitan Areas: Causes, Consequences and Policy Implications" Hatch 444, "Rural Restructuring in New York and the Northeast" Hatch 402, "Implications of Population Change in New York State"; and Hatch 488, "The Effect of Population Density on Welfare Participation." Other primary data come from a project funded by the Aspen Institute, "Diversified Rural Livelihood Strategies Among Low Income Farm Families in the Northeast."

TABLE 1.

Industrial and Occupational Employment
of Nonmetropolitan Workers in the Northeast:
1980 and 1988.

INDUSTRY	MALE		FEMALE	
	1980	1988	1980	1988
Agriculture	3.3	4.3	.9	1.7
Construction	13.9	16.6	1.1	1.9
Manufacturing	34.4	26.0	19.1	14.0
Utilities	9.1	8.2	3.8	3.0
Trade	12.2	15.4	20.4	19.9
Services	20.7	24.0	49.8	54.6
Government	6.4	5.4	4.9	4.2
OCCUPATION				
Prof/Man/Tech	29.4	23.6	26.4	29.2
Sales/Clerical	10.2	12.3	38.9	36.2
Craft Worker	24.9	27.2	1.4	2.2
Operative	26.0	24.3	14.4	11.8
Service Worker	6.9	7.5	18.2	19.2
Farmer/Worker	2.6	5.1	.7	1.3

Source: Current Population Survey, March Supplement, 1980 and 1988

TABLE 2.

Total Income of Workers Living in
Metropolitan and Nonmetropolitan Areas of the Northeast and Nonmetropolitan
Households with High and Low Incomes: 1979 and 1987.

	Total Income		%CHANGE
	1979	1987	
Nonmetropolitan	-----1987	Dollars-----	
Men	24,416	21,571	-11.6
Women	8,424	9,500	12.8
Metropolitan			
Men	25,970	27,442	5.7
Women	9,886	12,648	27.9
Nonmetro Household Income Categories	1979	1987	%CHANGE
Less than \$10,000	12.6	19.6	7.0
	16.9	18.3	1.4

RELATIVE IMPORTANCE OF AGRICULTURE AND MANUFACTURING IN NONMETROPOLITAN COUNTIES

Legend

 manufacturing

 mixed

 agriculture

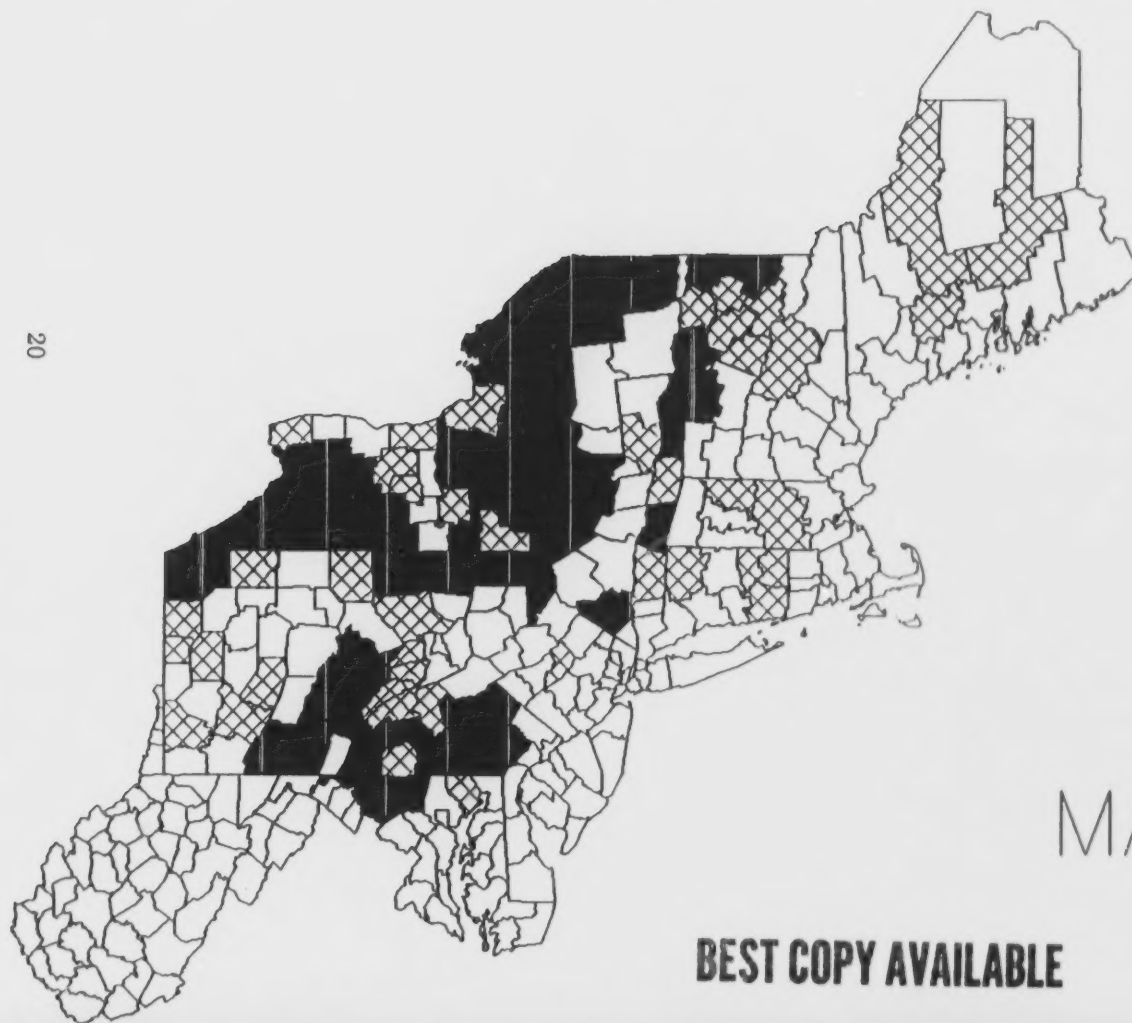
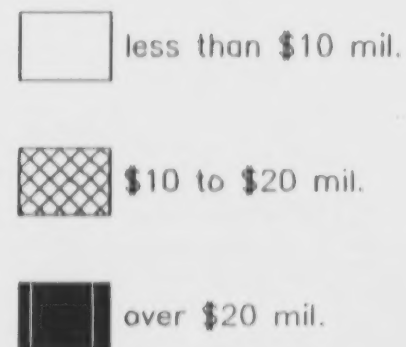


MAP 1

BEST COPY AVAILABLE

COUNTIES WITH DAIRY SALES OF AT LEAST \$10 MILLION YEARLY

Legend



MAP 2

BEST COPY AVAILABLE

DISTRIBUTION OF LARGE MANUFACTURING PLANTS

Legend



0 to 2 plants



2 to 16 plants



MAP 3

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LOSS OF LARGE MANUFACTURING ESTABLISHMENTS 1980-1986

Change

 loss of 2 or more

 other



MAP 4

31

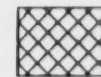
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CHANGE IN SMALL MANUFACTURING ESTABLISHMENTS 1980-1986



NUMBER OF SMALL MANUFACTURING EST.
PER CAPITA IN 1986

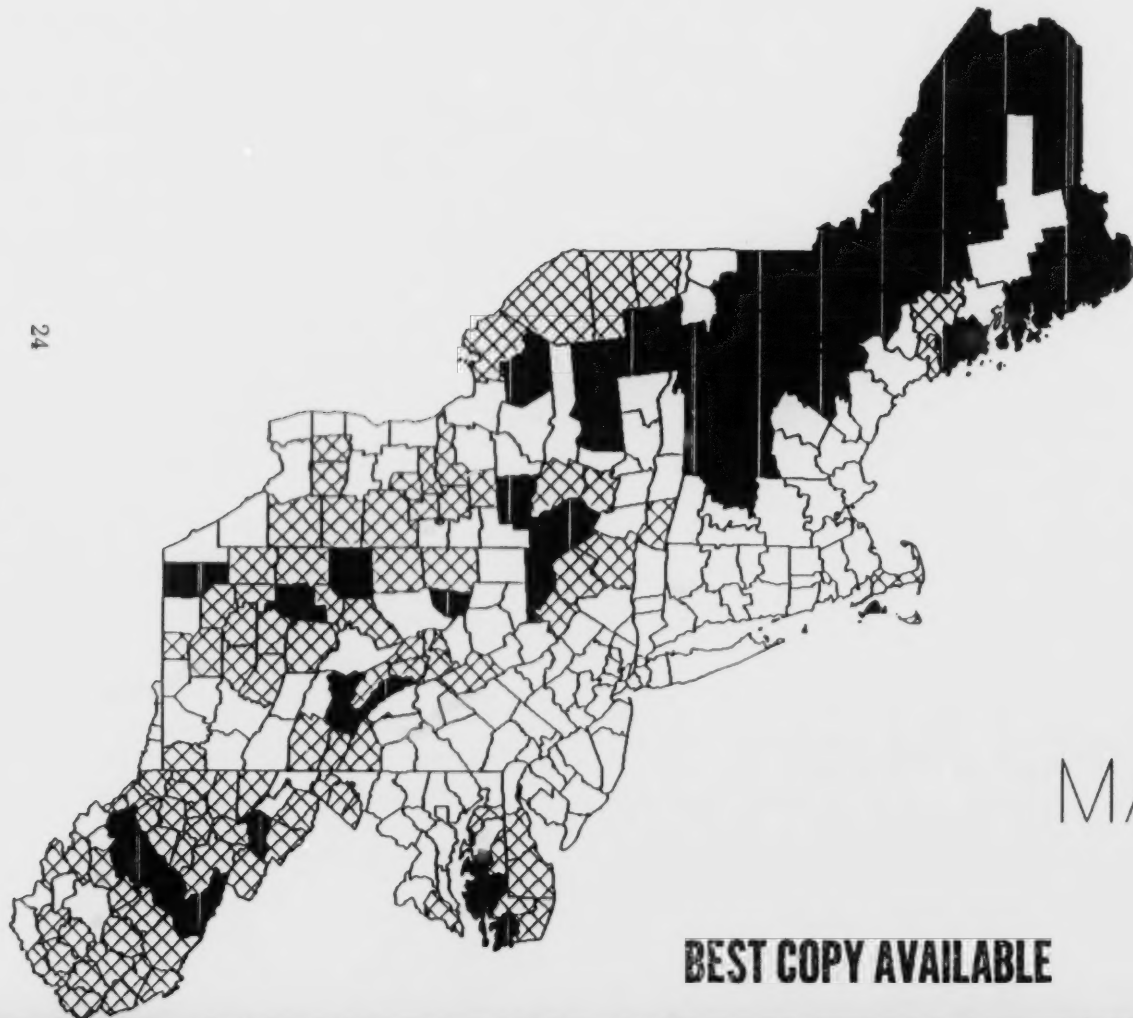
DENSITY



LOW



HIGH



MAP 6

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NUMBER OF PRODUCER SERVICE ESTABLISHMENTS

1986

Legend



3 to 100



100 to 573



MAP 7

37

36

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FISCAL IMPACTS OF ECONOMIC CHANGES ON THE REVENUES AND EXPENDITURES OF RURAL LOCAL GOVERNMENTS AND COMMUNITIES

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ABSTRACT

National and international economic changes have had impacts on the budgetary condition of rural local governments and on residents and businesses in rural communities in both growing and declining areas. This study reviews past literature on the impacts that economic changes have had on revenues and expenditures in rural local governments and communities, and identifies specific objectives for future research and extension programs for the Northeast region.

INTRODUCTION

Rural America experienced a revival in the 1970s. Faster growth in population and employment in rural than in urban areas contributed to a major decline in farming as the primary economic activity. The economic structure of many rural areas began to resemble that of urban areas as cumulative employment in manufacturing, construction, and the services sectors increased while employment in farming and other extractive industries declined.

The rural revival of the 1970s ended with the recession of 1981-82. The recession, coupled with the farm financial crisis and the energy industry depression, eroded the economic and fiscal health of rural America in the 1980s. To date, rural population growth lags behind the national growth rate. Rural unemployment rates exceed the national level, and rural incomes remain substantially below the national average (Stinson, 1990).

Many variables have influenced local fiscal conditions in rural America. These include demographic changes such as in- or out-migration and the aging of the rural

population; changes in intergovernmental (federal and state) aid; and changes in regional, national, and international economies. Because these variables are generally external, rural local governments have had little or no control over many of them in the past, .

The purpose of this study is to review previous literature on the impacts that economic changes have had on the revenues and expenditures of rural local governments and communities, and to identify specific objectives for future research and extension programs for the Northeast region. There are at least two important reasons to examine the impacts of economic changes on rural local government finance and rural communities. First, the economic and fiscal health of rural America will be a major area of public policy concern at the national and regional levels in the 1990s. Second, the 1990s will be a difficult time for many rural local governments. Slow growth in the U.S. economy over the next few years will retard growth in local revenues. Declining or stagnant own-source revenues and declining intergovernmental revenue resources will make the task of balancing local budgets more difficult and force many hard choices for rural local governments.

LITERATURE REVIEW

Previous literature on the fiscal impacts of economic changes on rural areas can be classified into two groups. The first concerns the impacts of economic changes on the revenues and expenditures of rural local governments; the second examines the impacts of economic changes on residents and businesses of rural communities. Each group covers several areas of research, and offers major theoretical and empirical findings.

Impacts on Rural Local Governments

The first group of studies examines the fiscal impacts of economic changes such as growth, recession, structural shifts in the national economy, international economic competition, and global fluctuations in the value of commodities and goods on the revenues and expenditures of rural local governments. These studies focus primarily on the impacts of economic decline on the budgetary condition of rural local governments, and note that while there is now a mix of growing and declining communities in the vast rural territory, a large number of rural communities are under painful and serious fiscal pressure. In the

past, however, in some cases economic growth and incremental prosperity did not help rural local fiscal conditions, but actually increased local fiscal stress. Thus, some of the past studies on the fiscal impacts of economic changes on rural local governments in both growing and declining areas should be reviewed.

Rural Local Governments in Growing Areas

Most rural areas experienced population and income growth in the 1970s. However, only rural areas that depended on retirement, government, and trade activities continued to grow in the 1980s. Population and economic growth have caused fiscal problems for some rural local governments in the past. Several studies have examined the impacts of growth on the revenues and expenditures of rural local governments. These include studies by Stinson (1981); Stinson and Voelker (1982); Bender and Stinson (1984); Rathge and Beegle (1984); Friedman and Rhomberg (1988); and MacManus (1990). Briefly, these studies suggest that, in the past, rural local governments in growing areas faced budgetary problems because the revenues derived from new developments were not enough to finance the cost of new, expensive public services and infrastructure for in-migrants.

Bender and Stinson (1984) note that rapid population growth can have at least four types of public sector fiscal impacts: spillovers, front-end deficits, boomtown effects, and uncertainties. Spillovers occur when the new population associated with the development spills over the boundaries of those local governments with authority to tax the new activity. "Localities with new residents but no new industrial tax base will almost certainly have negative fiscal impacts since taxes on households seldom produce revenues sufficient to cover all service costs" (Bender and Stinson, 1984: 60).

Local governments often face spillover problems from natural resource developments since resources and processing plants normally are located outside the limits of the locality and thus are not subject to local taxes. A study of the fiscal impact of a 5-million ton per year coal mine in Montana estimated that each new resident would be accompanied by \$73 worth of local taxes and state aid, while average per capita local expenditures were \$237 (Stinson et al., 1982). In the absence of special state and federal impact aid--such as that available to new energy boomtowns--the community must choose some combination of

increased tax rates and decreased quantity or quality of services. In either case the community's pre-development residents bear a cost.

Front-end deficits occur when local revenues do not increase as rapidly as population. New revenues generally are not available to localities until several years after development occurs. Lags are built into the property tax assessment and collection processes, and intergovernmental aid is frequently based on past rather than current population. Demands for public services, however, increase as population increases. The result is a short-term cash flow problem which may take several years to resolve (Bender and Stinson, 1984).

A study of the fiscal impact of coal development and electric generating plant construction in the Northern Great Plains estimated front-end impacts to be substantial for cities and counties in Montana and North Dakota. School districts in Wyoming were also estimated to have short-term revenue shortages. Since they receive revenue from both state and local sales taxes on construction materials, cities and counties in Wyoming were expected to fare better than those in Montana and North Dakota during the early phases of construction (Stinson and Voelker, 1982).

Boomtown effects occur when several new employers enter a community over a short period of time. Because the absorptive capacity of the local economy is limited, the locality undergoes serious fiscal strains. The strains are experienced in a series of front-end and spillover effects. In boomtowns created by large-scale energy developments or new industrial plants, growth in local government revenues often lags far behind the need for expanded public services. In the late 1970s and early 1980s, local governments in the mining and energy boomtowns in the South and West significantly increased their tax, debt, and spending levels to provide the community with the needed public services.

The fourth type of fiscal impact is caused by uncertainty. Here the concern is that the locality may be liable for large and unforeseen expenses attributable to new development. Bender and Stinson (1984) identify two types of potential expenses. First, a project's construction and operation schedules can vary. Communities anticipating demands for local infrastructure and public services risk increasing capacity only to have the project changed or canceled. Second, localities also face uncertain future expenses from potential environmental damage or from the need for additional human resources programs in case

the new plant shuts down prematurely. The degree of uncertainty over the project's viability also will affect the cost of bonds issued for local capital improvements. High technology activities produce the most notable uncertainty. But even manufacturing firms with stable technologies are accompanied by uncertainties due to changes in market conditions, regulations, or technology (Bender and Stinson, 1984: 63-64).

Population growth often results in increased demands for new services and improvements in the quality of existing ones. In the 1970s, as increasing numbers of people began to return to rural areas, expenditures per capita increased at a faster rate in rural areas than in urban areas. Growth in population, demands of new residents, imposition of federal and state mandates, and increasing availability of intergovernmental aid encouraged rural governments to increase their level of public services (Sullivan et al., 1981).

As MacManus (1990) suggests, rapid growth puts a tremendous strain on the revenues of the affected rural governments, primarily because of demands for service and infrastructure expansion. A study of fiscal conditions in New Jersey municipalities found that rural governments with their lower planning capacities often cannot handle increased demands for infrastructure and other services which generally accompany growth (Friedman and Rhomberg, 1988). Thus, without special measures to mitigate the impacts of rapid growth, rural residents will likely face a combination of tax increases and declines in public services.

The impacts of growth on local expenditures depend on several factors: type of growth, the existing level of each service in the community and any current excess capacity, the number of new residents and economic activities and their public service needs, and the likelihood that additional new services will be required for them. A community with substantial excess capacity can absorb many new residents with only a small increase in expenditures. But if existing facilities and personnel are already fully utilized, even a small increase in population can significantly increase local expenditures.

The per capita costs of maintaining the same quality of a given service may also change because of socio-economic changes in a community. A study of county areas in Florida, a rapidly growing state, and New York, a fairly stable state, showed that the socio-economic changes (i.e. changes in age and income) that accompany population shifts are as

important in determining changes in expenditure behavior as the population adjustments themselves (Fox and Sullivan, 1978). Also, a study of the impact of growth on Pine Tree, a rural Michigan County, demonstrated that fiscal problems associated with rapid population growth may worsen if the in-migrants are mostly seasonal retirees, transients, and welfare recipients (Rathge and Beegle, 1984).

The research evidence suggests that growth only helps the local fiscal condition in certain favorable situations. Farr (1983: 212) argues that "industries and commercial establishments generally produce more local tax revenues than they demand in services. Housing developments, on the other hand, generally do not. They can result in the need for new schools, parks, other community facilities, and social services which are expensive to both establish and maintain." Thus, the fiscal impacts of residential and non-residential development are not necessarily the same. These two types of growth do not necessarily occur together in rural communities (Friedman and Rhomberg, 1988).

In the past, some rural local governments have utilized strategies to mitigate the adverse impacts of growth. MacManus (1990) reports that rural governments in Florida have utilized alternative strategies to diversify their own-source revenues. These include local income and sales taxes, user fees and charges. Between 1980 and 1987, low-growth rural municipalities intensified their use of nonproperty taxes and some types of user fees. High-growth rural municipalities increased their dependence on nontax revenue sources such as charges and miscellaneous revenues, including growth stimulated special assessments and impact fees.

Bender and Stinson (1984) present the other strategies used by rural governments to cope with problems of growth. These include federal and state grants and loans, local growth management programs to restrict new development, annexation or consolidation of governments, contracting out services with other local governments or the private sector, and prepayment of property taxes.

Overall, it is suggested that "all impact mitigation strategies are not equally effective against all types of impacts. Some may worsen types of impacts while limiting others. Treating symptoms does not solve fundamental problems, and some popular mitigation strategies will be inadequate" (Bender and Stinson, 1984: 60).

Rural Local Governments in Declining Areas

Several studies have examined the impacts of population and economic decline on the revenues and expenditures of rural local governments. These include studies by Sullivan et al. (1981); Reeder (1987a); Lansford and Jones (1988); Wise (1989); and DeBoer (1990). In brief, these studies suggest that a large number of rural local governments depend on farm and natural resource industries such as timber, mining, and energy industries and manufacturing industries. This dependency has made them vulnerable to national and international economic changes. In the 1980s, rural local governments suffered from revenue decline or slow growth in revenues because of the 1981-82 recession, the structural shift in the U.S. economy, the farm financial crisis, and the energy industry depression. Declining tax bases and revenues coupled with limited taxing ability, increasingly expensive federal and state mandates, and declining federal aid placed fiscal pressures on these rural local governments.

Slower economic growth, inflation, and recessions or the expectation of recessions all affect the structure and growth of local government budgets. Bahl (1984) argues that inflation does reduce the purchasing power of local government revenues and may do so by a substantial amount. The impacts on expenditures may not show up immediately because of lagged responses or directly because governments may compensate for price increases by cutting services, but it seems clear that inflation has important and substantial effects on the expenditure side of the budget. The effects on the revenues may be much less pronounced, particularly for property taxes.

For local governments such as those in rural areas which are more heavily dependent on the property tax, the effect of inflation may be much greater. Local revenues, based largely on property taxes, do not automatically rise with the price level. Revenues increase only when tax rates are increased or when the value of taxable property is reassessed. As both actions are politically unpopular, local revenue growth often lags behind inflation. Sales and income taxes usually rise with inflation, but these revenues comprise only a small share of rural local revenues (Sullivan et al., 1981). Thus, rural local governments may face budgetary pressure if the growth in their revenues does not match with the increasing cost of public services that they have to provide.

In the 1970s, the increase in federal and state aid to local governments helped to relieve the fiscal effects of inflation. Aid to rural areas actually grew faster than aid to urban areas during the 1970s. Even with this help, many local governments raised tax rates, levied new taxes, and increased user charges to finance the same level of public services. Sullivan et al. (1981) suggest that user fees and utility charges were consistently more important revenue sources in rural than in urban areas in the 1970s.

During the recession of 1981-82, the budgets of state and local governments were squeezed so that the compensating tax increases and expenditure reductions did take place (Bahl, 1984: 113). A 1985-86 survey by the National Association of Counties (NACo) found 17 percent of the rural counties (under 50,000 population) with "no increase" in own source general revenue during 1981-86, when inflation increased state and local government costs by about 28 percent. Only 4 percent of urban counties (over 50,000) had a decrease in own source general revenue in the 1981-86 period (Reeder, 1987a:26).

The recession of 1981-82 affected rural America more than urban America, where cities are more services oriented and less manufacturing oriented than in previous years. Rural economies dependent on manufacturing industries were affected more significantly than the other rural economies. The recession substantially reduced employment in most rural manufacturing industries. By 1982, the unemployment rate for rural areas was almost 2 percent higher than for urban areas. This gap increased for several years, as the economic recovery was relatively low for rural America (Reeder, 1990). The largest employment decline occurred in the industrial Northeast and Midwest. However, the recession also affected poor rural counties, which are located mainly in the South (Reeder, 1989).

Rural areas, once regarded as the part of the nation most remote from even national economic trends, now seem to be at least as exposed to international developments. Sectoral problems in the major rural regions now experiencing economic distress all appear to be associated with international trends (Long et al., 1987). Rural economies dependent on labor-intensive manufacturing, mining, and agricultural activities did not perform well in the 1980s because of international competition. Rural manufacturing plants that produced labor-intensive goods faced stiff competition from abroad where wage rates were often lower than in the United States. The result was manufacturing cutbacks and plant closings in

rural communities. This reduced significantly the local property tax base in some rural communities.

Developments in international food markets caused the farm financial crisis of the mid-1980s. Agriculture provides the economic base for many rural communities, making it an important industry. Agriculture provides income and employment both directly and indirectly for millions of rural residents. An adequate tax base is also supported through this economic activity which allows communities to provide required services to all residents (Lansford and Jones, 1988). Agricultural decline put many rural communities under fiscal pressure. A study by the U.S. Senate found that from 1980 through 1984, real farm incomes averaged 40 percent less than in the 1970s. Also, nationwide, agricultural land values fell by more than 30 percent, or \$227 per acre, between 1982 and 1985. The declining farm incomes and farm property values eroded the local tax base and the ability to raise revenues.

Like agriculture, the energy industry also experienced a sharp downturn because of international factors. Increased international energy supplies and stagnant world demand led to significant declines in energy prices in the late 1980s. Rural local economies dependent on the energy industry experienced a significant decline in income and employment levels.

The two major revenue sources for rural local governments are property taxes and intergovernmental aid. During the past two decades, all local governments have become less reliant on property taxes. By 1977, state aid and federal funds passed through the state replaced the property tax as the leading source of revenues in rural areas. More than 47 percent of the general revenues of local governments in rural areas came from the state and federal governments (Sullivan et al., 1981: 10).

In the 1980s, however, federal and state aid to local governments declined sharply. The termination of General Revenue Sharing and reductions in some other federal aid programs placed a major financial burden on rural local governments. A U.S. Senate study found that the loss of General Revenue Sharing in 1986 may have had a greater impact on the financial outlook of many local governments than the massive declines in farmland values did in the early and mid-1980s. By the early 1980s, most rural governments still

obtained over one-third of their revenues from federal and state sources, mostly state (Reeder 1987b: 34).

To compensate for the decline in federal aid, local governments had to raise more revenues locally through higher local property tax rates or new nontraditional sources such as local income and sales taxes and user fees. Because many rural residents were unwilling to pay higher property taxes and some state governments imposed limits on local property tax rates, rural local governments had to institute new local income or sales taxes and user fees. For many rural governments, this increased effort to raise taxes meant greater local fiscal stress. The incidence of such fiscal stress has been greatest in the northern and central United States (Reeder, 1987b).

The benefits of tax diversification have not fully been exploited by rural local governments in the past. A study of the agricultural recession of the first half of the 1980s in the north central states discovered that only small local governments in two states -- Kansas and Missouri -- greatly increased their use of local sales taxes (DeBoer, 1990). The reason for this lack of diversification was state restrictions on the use of nonproperty taxes at the local level. Stinson (1990) indicates that to date, these taxes, have received only limited use and the revenue collected from them has not increased substantially as a percentage of local own-source revenue during the past decade.

On the expenditure side, rural local governments increased their real per capita spending by 4 percent from 1977 to 1982, despite reduced federal and state aid (Reeder, 1987b). From 1977 to 1982, rural spending grew mostly for utilities and other local government expenditures such as health, hospitals, sewage, sanitation, interest payments, jails, and "other" general expenditures. Only education showed a real decline (Reeder, 1987b).

The increase in spending was in response to an increase in costs associated with state and federal mandates, especially in environmental areas; an increase in the per capita cost of providing services due to population decline; and new demands for services such as job training, welfare, counseling, and housing assistance to help the underemployed and unemployed individuals and their families to cope with local fiscal crisis. Additional funds were also needed to deal with economic difficulties such as business assistance, public services, and infrastructure improvements.

The pattern of expenditures by rural local governments has changed slowly over time as basic demographic and social changes occurred. In the 1970s, for example, a greater significance was given to educational expenditures. Education was the largest single expenditure item in local government budgets. Local expenditures on health care services and facilities increased as the population grew older. An increasing rate of household formation and greater concern over crime led to rising expenditures for fire and police protection (Sullivan et al., 1981).

In the 1980s, however, the economic difficulties had different impacts on rural local public services. To maintain the existing level of public services, local government officials had to cutback on the quantity or quality levels of some basic services. Moreover, in order to respond to the fiscal needs of those individuals and families affected by economic difficulties, local governments had to provide a range of other employment and social services. This required deferring new infrastructure projects in some rural areas.

The environment of revenue scarcity did not lead to a decline in the overall quantity and quality of public services in all rural communities. A study of the fiscal management of small towns in Iowa showed that some communities offset declines in revenue by improving the efficiency and productivity of service delivery (Koven and Koven, 1989). Other rural communities across the country have also pursued greater efficiency through innovative arrangements for local service delivery, improvement of management capabilities, and aggressive reviews of program performance and priorities. Cooperative agreements among governments and contracts with the private sector to provide public services are two techniques used to employ available funds more effectively (Sullivan et al., 1981). Cooperative or joint agreements among governments offer the possibility of the cost-sharing of public services such as emergency medical services, law enforcement, and fire protection.

Small communities also have used revenues collected earlier (surplus) to maintain existing levels of services. The use of surpluses can be an effective strategy for sudden twists and turns in expenditure and revenue flows. In the long run, however, such a strategy only obscures budgetary imbalances and forestalls an inevitable day of reckoning when expenditures have to be cut to correspond to revenues (Koven and Koven, 1989: 297).

Rural Local Governments in the Northeast Region

Past studies on local fiscal conditions in the Northeast region were either regional (Eberts and Khawaja, 1987) or state-wide in scope (Friedman and Rhomberg, 1988; Watkins and Allen, 1988; Schmidt and Gent, 1989; Atash, 1990; Eberts and Khawaja, 1990; Longest, 1990). A study of causal factors affecting local fiscal stress in 166 counties in the Northeast found that local fiscal stress is due primarily to comparatively high local highway expenditures, high local demands for services, rural location, high local needs in terms of unemployment and crowded housing. The study found that small rural counties experience greater fiscal stress than large suburban or metropolitan counties in the Northeast (Eberts and Khawaja, 1987).

The state case studies were part of a regional research project. They offer major findings related to the identification and measurement of fiscal austerity, fiscal problems, and alternative strategies for handling fiscal problems in six states in the Northeast: Maryland, New Jersey, New York, Rhode Island, Vermont, and Maine.

The termination report (Eberts, 1990) of this regional research project indicates that localities in different states have different patterns of fiscal stress. In brief, rural and other low-capacity local governments are generally among the more stressed localities. Chief-elected officials generally blame several conditions for their problems, especially increased liability insurance costs, reduced federal revenue sharing, mandated costs from state and federal governments, and rising service demands from citizens due to locality growth and from environmental concerns.

In addition, the regional research project found that rural localities have fewer strategic options for dealing with their fiscal stresses than their counterparts in urban and suburban localities. To obtain funds, most localities turn to state governments, enhanced local economic development, or increases in local taxes.

Impacts on Rural Communities

The second group of studies examine the impacts of economic changes on local residents and businesses in rural communities. These include studies by Killian and Hady

(1988); Lansford and Jones (1988); Bluestone and Long (1989); Majchrowicz (1989); and Wise (1989). These studies analyze impacts of national and international economic changes on employment and income levels and public service needs of local businesses and residents and their personal lives. In brief, these studies note that rural communities were affected differently by economic changes in the 1970s and 1980s. During the past two decades, some parts of rural America did very well economically, experiencing rapid employment and income growth. Other rural areas, however, did not fare nearly so well. Stagnating local economies, outmigration of the young and well-educated, and excessively high unemployment typified much of rural America (Killian and Hady, 1988: 2).

Rural Communities in Growing Areas

Earlier national and international economic changes had favorable impacts on employment and income levels in some parts of rural America. Some 74 percent of nonmetro counties enjoyed at least moderate employment growth (2% or more) in the 1970s but only one-third grew that quickly throughout the 1969-1984 period. Four major industry groups were leading sources of employment growth in many persistently growing nonmetro counties between 1969 and 1984: manufacturing, government, services, and trade (Bluestone and Long, 1989).

States with the highest proportions of persistently growing counties clustered in three regions: California and Nevada in the West; Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, New Jersey, and Delaware in the East; and Georgia and Florida in the South. The situation was different in eight other states (Oregon, Washington, and Idaho in the Northwest; North Dakota, Minnesota, Nebraska, and Iowa in the Midwest; and West Virginia in the East), where many counties that grew during the 1970s faltered in the early 1980s (Bluestone and Long, 1989).

Only three types of nonmetro counties were able to carry their growth trends into the 1980s: retirement, government, and trade. Each of these counties accounted for the same proportion of rural population, income, and employment as farm-dependent counties (12%) in 1984 (Henry et al., 1987). Employment growth was particularly strong in retirement-

dependent counties, where the expanding number of retirees increased the demand for local services.

The overall rural-urban income gap narrowed from 1965 to 1973. Total personal income grew faster in all types of nonmetro counties than in metro counties. From 1965-1973, the most significant gains in income occurred in farming and mining counties. Specifically, in 1973, U.S. crop prices soared due to unique world circumstances, including world crop shortages and increased Soviet imports. As a result, income increased significantly in farm-dependent counties. Rural counties dependent on manufacturing, government, trade or retirement activities improved less dramatically in this period (Henry et al., 1987: 25).

From 1973 to 1984, when the rural-urban income gap widened, only the retirement-dependent counties were able to improve their relative well-being. Incomes of all other types of nonmetro counties fell further behind the metro level (Henry et al., 1987).

The population and employment growth has caused problems for the long-time local residents and businesses of some rural communities in growing areas. The rising demand for new services has placed severe pressure on the quantity and quality levels of rural public services such as education, health, fire, and police protection, and infrastructure such as water, sewer, waste disposal facilities, and roads. Also, rapid growth has led to congestion and crime in many rural areas.

Random and unplanned residential and commercial expansion has created deleterious consequences in rural areas. Increased demand for land has inflated land values and thereby elevated property taxes. This impact fell disproportionately on those with fixed incomes, such as the elderly. Also, unplanned growth resulted in the loss of many acres of prime farmland and open space in rural areas. Similarly, overdevelopment of scenic locations along lakes and rivers usually produced undesirable environmental and aesthetic consequences.

Rural Communities in Declining Areas

The recession, the farm financial crisis, and the energy industry depression had adverse impacts on local residents and businesses in a large number of rural communities in the 1980s. Rural areas did relatively well and as a group outpaced urban areas in employment growth in the 1970s but fell far behind in the early 1980s as the nation's economic activity slackened. Nonmetro wage and salary employment rose only about 1 percent between 1979 and 1984, compared with a gain of almost 6 percent in metro areas (Bluestone and Long, 1989: 8). During the 1979-1986 period, 48 percent (1,146) of rural counties declined in employment or did not grow (Rural Conditions and Trends, 1990: 6).

During 1979-1986, employment declined in all nonmetro goods-producing industries except construction, which gained less than 1 percentage point. Nonmetro mining suffered the most, declining 13.9 percent (Majchrowicz, 1989: 34). Manufacturing was the leading source of decline in about one-third of nonadjacent nonmetro counties. Manufacturing in the persistently declining counties may have been adversely affected by more stringent environmental regulations and changing technologies, which have made older manufacturing plants less competitive, especially in low-wage, labor-intensive industries (Bluestone and Long, 1989).

From 1986-89, however, rural employment growth quickened, and differences among rural counties narrowed. The share of rural counties with no growth or decline fell to 28 percent. Employment growth and decline was more geographically focused in 1986-89. The resurgence in U.S. manufacturing improved the job situation in some rural counties. But lower energy prices still plagued oil industries in Texas, Oklahoma, and Louisiana and mining in Wyoming. The highest rate of employment decline was in the farming counties of mid-America, despite the recovery of farm incomes (Rural Conditions and Trends, 1990: 6).

From 1973-84, the most dramatic drop in income was in farm-dependent counties. Incomes in manufacturing-dependent counties showed a slow but steady downward trend. Income in mining-dependent counties fluctuated during the period but ended in 1984 the same as 1973. Government and trade counties showed little change from their 1973 positions (Henry et al., 1987).

The past economic changes also had adverse impacts on the lives and well-being of rural residents. The impact was the most dramatic in farm-dependent communities. Individual farmers, their families, and agribusiness firms were adversely affected by the farm financial crisis, which created a sense of helplessness, hopelessness, and futurelessness.

The adverse effects of the farm financial crisis were reflected by losses in employment and income, high rates of farm loan delinquencies, farm foreclosures and bankruptcies, increased incidences of suicides, poverty, and the out-migration of educated young adults. Adverse effects on agribusiness firms were indicated by a decline in employees; a decline in sales of products and services, such as fertilizer, grains, and vegetables; and in the closing of a significant number of agribusiness firms (Wise, 1989: 27).

The farm crisis and the energy industry depression affected local business sales and employment, real estate values, property tax rates, and service demands in many rural areas. A lack of opportunities for young men and women resulted in the out-migration of many of the most able young residents. This out-migration caused further deterioration in local tax bases and put pressure on local governments to provide services to an economically depressed and dependent population (Koven and Koven, 1989). In some areas, the loss of population forced local officials to cutback rural public services and close certain public facilities.

FUTURE RESEARCH AND EXTENSION PROGRAMS

A selected review of past literature demonstrates that research on the impacts of economic changes on the revenues and expenditures of rural local governments and communities in the Northeast region is limited. Most recent research was either national in scope or focused on other regions. Thus, as rural local governments in the Northeast attempt to assess their fiscal capacities and needs to meet the great challenges of the 1990s, additional research and extension programs are needed to guide their efforts.

Research Programs

Several future research areas can be identified. First, rural problems are not uniform. They have many unique local and state dimensions. Rural localities in the Northeast have different patterns of fiscal stress and austerity. Thus, spatial or geographic locations are key to understanding local fiscal stress. One major area of research is to examine variations in local fiscal conditions (i.e., capacity, effort, and need) among rural localities that are in proximity to the region's large urban and metropolitan centers and those that are more isolated. From these analyses, future research may generate models relating fiscal stress to the demographic and socio-economic characteristics of rural localities in the Northeast.

Second, researchers should model the future industrial and occupational composition of rural economies in the Northeast and determine how such changes affect rural governments' budgets, and income distribution and poverty in rural communities. Additionally, the future research should investigate how rural local governments and communities in the Northeast will manage the fiscal implications of economic changes--in some instances controlling growth in growing localities, and in others stimulating growth in declining localities.

Rural governments and communities have fewer strategic options for dealing with fiscal stress than their counterparts in suburban and urban areas. Innovative local fiscal management strategies are needed to cope with fiscal problems in rural communities in the Northeast. Specifically, we need to find out how rural governments are coping with major cutbacks in rural public services. What criteria have been used, and what are the most influential factors in decisions about differential support of various services? Moreover, we need to know the effect on the distribution of the costs and benefits of different services among users and the broader community.

Third, federal and state mandates (i.e., in education and environmental areas) are increasing and presenting major problems for rural local governments. The impact of federal and state mandates upon local governments has been a topic of study for many years. However, little analysis has been done in the Northeast states. Future research should examine the fiscal impacts of federal and state mandates on rural local governments.

Also, a formula should be developed to determine how state governments might reimburse local governments complying with mandates. Models for such a formula exist in California and Iowa.

Fourth, while states mandate many programs and services without providing adequate funding, they allow communities few options for diversifying revenues. The research evidence suggests that revenue diversification makes it easier to maintain current levels of government services and infrastructure without incurring excessively high property tax rates. But as Reeder (1990) suggests, rural revenue diversification has its advantages and disadvantages. Future research should examine these and identify types of rural communities that may benefit from revenue diversification in the Northeast.

Fifth, maintaining and improving the quality of public services in rural communities is a key priority for the 1990s. If rural services are allowed to deteriorate, those person's growing up today in rural communities may lack the human capital needed to compete successfully within the global economy (Stinson, 1990). We need to evaluate alternative strategies to provide essential services such as education, health care, public safety, public transportation, and waste management in small and isolated rural communities, and to develop new organizational models to finance and deliver such services in rural communities. Specifically, the research can determine whether service cost structures differ by size of localities, and which services exhibit economies of size, and can identify contiguous jurisdictions likely to benefit by consolidation of services.

Sixth, heavy dependence on the property tax in rural communities makes new developments central to local finance. Seeking new development is a common way to try to improve the local fiscal condition. The research evidence suggests that growth helps the fiscal condition only in certain favorable situations. Future research should investigate the impacts of different types of development (i.e., residential, commercial, industrial, and recreational) on the revenues and expenditures of rural local governments.

Seventh, localities have different fiscal needs which require differential support by state governments. It is important to evaluate and change existing aid formulas applicable to rural areas, with the purpose of removing urban bias from these formulas. As Reeder (1989) suggests, this may involve dropping biased indicators or replacing one indicator with

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another. Besides the choice of indicators, alternative ways to weight and combine the indicators in the formula should be examined.

Eighth, the recent surge in bank failures in the Northeast requires major studies on their impacts on local fiscal conditions and credit availability in rural communities.

Extension Programs

Extension can play several roles. First, the transfer of research knowledge to rural local officials is now more important than ever. Doeksen and Peterson (1987: 17) note that extension personnel and researchers need to develop extension materials that present the findings of their research to rural public officials, residents, and businesses.

Second, extension personnel can identify the most critical rural development policy issues and options; educate rural leaders on issues, options, and consequences; reduce fragmentation; increase communication; and begin building a consensus between and within levels of government and others in rural development. Especially, extension personnel may work with rural community decision makers to solve rural budgetary problems. Community decision makers in rural areas are often volunteers who hold full-time jobs. They do not have the time to analyze problems and seek alternative solutions.

Third, rural local governments often lack the leadership capacity and technical expertise required to apply for grants. Technical assistance offered by extension would benefit rural areas greatly. This would be particularly beneficial to economically distressed rural communities in their attempts to devise effective economic development strategies.

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ECONOMIC AND SOCIAL OUTCOMES OF PUBLIC AND PRIVATE INVESTMENTS IN PHYSICAL INFRASTRUCTURE FOR GROWTH AND STABILITY OF RURAL ECONOMIES

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ABSTRACT

This paper serves as an overview of current thoughts about and understanding of the role of infrastructure in rural economic development. Attention is paid to how investments in infrastructure may or may not promote higher rates of economic growth and development. A brief review of studies that examine the link between investment in economic and social overhead capital and economic development and growth is also provided. Suggestions for both research agendas and extension programming are offered.

INTRODUCTION

Considerable attention has recently been paid to the status of the stock of public infrastructure. The national report, America in Ruins (1981), renewed interest in the vitality of the public infrastructure. The report's general conclusion suggested that "America's public facilities are wearing out faster than they are being replaced. The deteriorated condition of the basic public facilities that underpin the economy presents a major structural barrier to the renewal of our national economy." Subsequent studies have concurred with the grim status of the nation's stock of infrastructure. Using an academic grading scale, the National Council on Public Works Improvement (NCPWI) (1988) graded America's infrastructure a scant C-, or barely adequate to support current needs. The NCPWI warned of the possible barrier placed by the current stock of infrastructure on future economic growth and development.

One particular basis for concern is the declining rate of investment in the nation's infrastructure. The NCPWI observed that over the past two decades the percentage of national resources devoted to infrastructure investment declined from 3.5 percent of Gross

National Product (GNP) in the 1960s to 2.5 percent of GNP in the mid-1980s. The decline in new infrastructure investment is even more striking, declining from 2.5 percent of GNP in the early to mid-1960s to slightly more than 1 percent in the mid-1980s (Fox and Smith, 1990).

Stein (1988), however, points out that from a national perspective, an over-investment in infrastructure may have occurred that thus would lead to a general surplus. If this is the case, the declines observed by NCPWI may simply be an adjustment to an infrastructure surplus. Alternatively, the need for new investments may not be as high as in previous years. For example, the Interstate Highway System is now near completion.

Within this broader context, a consensus has developed suggesting that the majority of the required infrastructure is in place, but increasing rates of deterioration are not being sufficiently compensated for by a higher level of public resource commitment to repair and/or replacement. The Congressional Budget Office reprinted the following:

The most pervasive problem affecting the nation's infrastructure is physical deterioration resulting in mounting needs for repair, rehabilitation, and replacement. Many components of infrastructure systems show the effects of aging, and some are approaching the end of the 'design lives' planned by their engineers and builders. Aging problems are compounded by the cumulative effects of inadequate maintenance and repair (Congressional Budget Office 1983:6).

Studies specific to rural areas, while not as complete as national studies, draw similar conclusions (Chicoine and Walzer, 1984; Hackett and Busson, 1986; Walzer and Chicoine, 1987; Stinson, Sullivan, Ryan and Reid, 1989; and Ryan, 1990). While studies specific to the Northeast are limited, patterns identified in national and other regional studies have been found to apply to infrastructure investments in the Northeast (Deller, 1989). In addition, a few of the studies focused on rural areas have found that a significant investment in new, previously nonexistent, infrastructure is required. For example, changes in federal water quality mandates and recent shifts in the rural economy have created new demands for infrastructure currently not in place (Hackett and Busson, 1986). Thus, many rural areas are faced with infrastructure problems on two fronts: the repair and replacement of existing infrastructure and the building of new infrastructure.

The most commonly cited cause of infrastructure deterioration is the lack of sufficient funding (Sinha, Pickett and Hittle, 1981; Baumel and Schornhorst, 1983; Chicoine and Walzer, 1984; Hulten and Peterson, 1984; Hackett and Busson, 1986; Walzer and Chicoine, 1987; NCPWI 1988; and Chicoine, Walzer and Deller, 1989). In short, increasing rates of deterioration require more extensive repair and/or maintenance schedules. This is particularly true in the rural Northeast where infrastructure tends to be older and the suburbanization of rural areas has placed excessive demands on the current infrastructure stock.

Given the Reagan legacy of fiscal federalism, the financial responsibility of an accelerated repair schedule is falling increasingly on local governments. Since 1977, local government expenditures have continued to rise while expenditures from higher levels of government have fallen. The result has been an increasing shift in responsibilities away from state and federal toward local levels. Indeed, local governments now provide one-half of the monies spent on public works, compared to 38 percent 20 years ago (National League of Cities, 1987; Doeksen and Allen, 1990). While demands for limited local resources are increasing, the option of increased repair and/or maintenance schedules may not be a viable alternative for many local governments, rural or urban.

The deterioration of existing rural infrastructure, the need for new investment in previously non-existent infrastructure, and the struggle to develop sufficient financing are the reasons the issue addressed in this paper is so critical. There is a general belief that without adequate infrastructure, rural areas may find it difficult to support economic development and growth. Yet, without a sufficient level of economic activity and growth, it may be difficult to finance the necessary replacement and/or maintenance of the existing stock of infrastructure (Doeksen and Allen, 1990).

The linkage between the level of the infrastructure stock and economic development and growth, however, is not well understood. Only a relatively small number of studies have sought to establish the linkage between infrastructure investment and economic growth (Aschauer, 1990; and Eberts, 1990). Yet many of the empirical studies that report a statistical relationship between infrastructure investment and economic growth must be discounted because causality had not been adequately established (Doeksen and Allen, 1990). Specifically, whether investments in various types of infrastructure cause or result in higher rates of economic growth has been not firmly established. Indeed, Hulten and

Peterson (1984) found that "no evidence has been advanced to show that deterioration of public capital has significantly influenced the productivity of the nation's private sector as a whole." The preponderance of available evidence, however, implies that some link exists.

The intent of this paper is to provide an overview of current thoughts about and understanding of the role of infrastructure in rural economic development. The paper is organized into five sections beyond the introduction. In the first section the notion of infrastructure is examined. Next, the conceptual framework relating infrastructure and economic development and growth is discussed, followed by a brief sampling of studies examining the impact of investments in specific types of infrastructure. The paper continues with suggestions for future directions in research and extension, with specific attention paid to the needs of the Northeast. The paper closes with a short summary.

NOTIONS OF INFRASTRUCTURE

Defining infrastructure and how to measure its level of quality and quantity presents difficult technical questions. Some have taken a relatively narrow view and provide a tangible listing of certain items such as transportation systems, water and sewer systems or the telephone network (CBO, 1983). Others have taken a broader perspective and refer to infrastructure as fixed capital investment, or as the physical installations supporting socioeconomic activities within a region (Fox, 1988; Petersen, 1988; Hite, 1989; Sears, Rowley and Reid, 1990). Many national studies have tended to focus on this very narrow concept of infrastructure.

Focusing on the fixity, in a geographic sense, of infrastructure creates problems regarding comprehensiveness of the definition. This narrow definition excludes items that may be viewed as part of the total infrastructure, such as investment in human capital and investment by the private sector in their productive capital (Fox, 1988). Hansen was the first to suggest a broader-based definition of infrastructure in a series of articles in the mid-1960s. Specifically, infrastructure in this broader context can be categorized as either economic overhead capital (EOC) or social overhead capital (SOC). Johnson (1990b) links the notions of EOC and SOC to the spatial location or, more important, fixity of the particular type of infrastructure. Economic overhead capital tends to be fixed in a spatial

sense, such as roads and bridges, whereas social overhead capital tends to be mobile, such as human capital and social services.

The distinction made between EOC and SOC is important in conceptualizing and measuring the quality and quantity of existing infrastructure and future investment. In addition, the distinction is important with respect to assessing the linkages between infrastructure investment and economic development and growth. Specifically, the economic impact of an investment in infrastructure that has a fixed location, such as a highway interchange, will occur in the area immediately surrounding the location of the investment. In contrast, the impact of an investment in social overhead capital may or may not affect the location in which the investment was made. An example of the latter may be the flight of a highly trained labor force to job opportunities outside the local economy.

Besides the methodological issues related to assessing linkages, the implications of this distinction for economic development policy are important. Investments in physical and social infrastructure influence the economic competitiveness of an area, and directly affect the quality of life. Such impacts are felt directly by rural residents through improved access to certain basic necessities and comforts. Ease of mobility, access to quality health care, and a quality supply of drinking water all influence the quality of day-to-day life. Other facilities that affect the quality of life in rural areas include parks and recreational facilities, libraries, museums, and other cultural facilities. The nature of the linkages between physical and social infrastructure and economic development and quality of life are complex and vary by the type of infrastructure and the desired outcome.

An alternative and perhaps complicating view of infrastructure suggests that the physical facilities that comprise economic overhead capital have no basic intrinsic value. Their value is derived from the demand for the services that they help produce (Chicoine, 1986; Fox, 1988, 1990). The value of a section of road in and of itself is only worth the next highest use of the right of way, gravel, and concrete that went into its construction. The true value of the road is derived from its use as a means of transporting inputs and outputs of private production or carrying persons from one location to another. The ability or inability to measure this service flow is at the heart of the complex problem relating the quality and quantity of the stock of infrastructure and future investment to economic development and quality of life. In addition, this broader view of a flow of services may

free policymakers from the "engineer" view of infrastructure and help to develop a broader range of policy options.

CONCEPTUAL FRAMEWORKS LINKING INFRASTRUCTURE AND DEVELOPMENT

Following traditional economic theory, public infrastructure can be viewed as an input into the private production process in much the same way as labor and private capital (Eberts, 1990). Many studies linking investment in public infrastructure and economic growth estimate empirical "regional production functions" which relate regional economic output to levels of infrastructure investment (Eberts, 1986). In this framework, the stock of infrastructure may enter directly into the production process, much like water in some manufacturing and agricultural processes. Alternatively, the stock of public infrastructure may play an indirect role by inducing an increase in the productivity of other private and public capital. For example, a quality transportation network will decrease the cost of transporting inputs and final products from and to markets in terms of money and time.

Examining growth rates in the level of productivity at both the national and state levels Aschauer (1989a, 1989b, 1990) identified a consistent link between infrastructure levels and economic productivity. Aschauer (1989a) concluded that "as much as 60 percent of the productivity slump in the United States can be attributed to neglect of our core infrastructure." Yet, some researchers question the validity of many of these national productivity studies (Hulten and Peterson, 1984). Nevertheless, these studies, and the intuitiveness of the conceptual framework, lead to the logical deduction that a higher stock of infrastructure, both public and private, leads to further private investment and thus economic growth (Doeksen and Allen, 1990).

This framework, however, does not address the more fundamental policy question: will a higher rate of investment in the stock of infrastructure necessarily lead to a higher rate of economic development and growth in the locality of the increased investment? Before addressing this very important issue, economic development and growth must be better defined. Johnson (1990a, 1990b) notes that the nature of the economic impact resulting from an investment in infrastructure may be either short or long run in nature. Short-run impacts include the economic benefits resulting directly from the investment project itself. These would include the employment of construction workers and contractors

and the purchase of materials used in the public facility. These economic benefits tend to accrue only during the construction phase of the investment. Such a policy may be warranted in periods of severe economic downturn and high unemployment.

Long-run impacts occur as the infrastructure project stimulates the rate of economic development and growth beyond the construction phase of the investment. Higher economic growth may take the form of increased productivity of existing firms, either directly or indirectly as discussed above, or the attraction of new firms or residents into the region of the infrastructure investment. Alternatively, long-run impacts may be viewed as providing a foundation for sustainable economic development and growth. From a policy perspective, the goal of infrastructure investment tends to be the promotion of higher rates of long-run economic development and growth.

Assessing the linkage between infrastructure investment and short-run economic impacts tends to be relatively straightforward and a variety of methods are available (Johnson, 1990b). Assessing the linkage between the investment and long-run economic development and growth, however, is much more difficult. Although studies such as those by Aschauer have identified statistical links, the central issue of causation has not been adequately addressed. Henry et al (1989) argue that "it cannot be deduced from research that infrastructure investment will lead a priori to regional development improvement."

The current opinion of researchers is that the economic and social conditions of the region in which the investment in infrastructure is to be made, plays a vital role in determining the level of future economic development and growth. To see this, Hansen (1965) suggests that regions be classified as one of three types--"high," "medium" and "low." Hansen envisioned 'high' regions as rapid growth areas that can be characterized as congested and where the current levels of the infrastructure stock are a barrier or constraint to future growth. These regions tend to be rapidly growing urban centers that need new infrastructure investments to support new, higher levels of economic and social activity. Here, an investment in infrastructure is in response to congestion resulting from economic growth and development.

Hansen visualized "medium" regions as demonstrating the potential for economic growth and development. Potential was defined by Hansen as a sufficient level of social overhead capital--an abundance of quality labor, inexpensive energy, and a network of

social and cultural activities. Here, an investment in infrastructure may serve as a catalyst sufficient to foster rates of economic development and growth at levels such that the benefits derived by the public outweigh the costs.

Regions defined as "low" by Hansen are characterized by a low level of social overhead capital--a low standard of living, an untrained labor force, stagnant or declining industry, and a declining population base. Generally, these regions are viewed as having little potential for sustainable economic development and growth. Hansen observed that in regions defined as "low" investment in infrastructure may not have the desired outcome. In short, the costs will probably be greater than any benefits that might flow from the investment.

Limited research, however, supports Hansen's view that the effect of infrastructure depends on the community's economic environment. In an examination of infrastructure investment impacts in Mexico, Looney and Fredericksen (1981) concluded that investments in infrastructure had the greatest economic impact in 'medium' regions and investment in social overhead capital had the greatest economic impact in 'low' regions.

An alternative view of Hansen's concepts has been put in terms of necessary and sufficient conditions (Johnson, 1990a; Sears, Rowley and Reid, 1990). Three potential cases can be envisioned. One case involves situations where infrastructure investment is both necessary and sufficient to stimulate economic growth. Here an investment will guarantee economic development and growth. Unfortunately, few cases would fall into this category. An investment in infrastructure in and of itself will probably not lead to economic development (Fox, 1988; Sears, Rowley and Reid, 1990).

Another case involves situations where infrastructure investment is necessary but not sufficient. More investment must occur prior to increased rates of economic development and growth but will not ensure the materialization of higher rates of development and growth. For example, the placement of communication lines is necessary for business location but will not ensure that businesses will locate in the area where the lines were laid. Sears, Rowley and Reid (1990) note that "numerous cases probably exist where investments to fill gaps in a locality's infrastructure, made in conjunction with other community investments (e.g. investments in social overhead capital) lead to economic development."

The final case corresponds directly to Hansen's "low" regions; infrastructure investment is not necessary nor sufficient. In this situation some element or elements, such as an inadequate level of social overhead capital, will serve as an impediment to higher rates of economic development and growth. Here the cost of the project incurred will be greater than any potential benefits. Unfortunately, many regions fall into this category.

In light of Hansen's conceptualization of the problem and the use of necessary and sufficiency conditions to view it, the conclusions of Fox (1988) seem perhaps the most reasonable. The stock of infrastructure, both quality and quantity aspects, should be viewed as a constraint in the economic development and growth problem. If some part of the stock of infrastructure acts as a constraint to potential economic development and growth, then investment in infrastructure (i.e., a lifting of the constraint) may result in realized economic development and growth. If on the other hand, the stock of infrastructure does not act as the relevant constraint, but rather there is some other binding constraint (e.g., inadequate level of social overhead capital), investment in infrastructure will not result in economic development and growth.

The success or failure of an investment in, say, an industrial development park can be easily understood in the framework outlined by Hansen, Johnson, Sears et al and Fox (see Kriesel, Deaton, and Johnson, 1988). If select firms within a community are having trouble gaining access to transportation nodes, physical facilities, quality communications, water and sewer, services and electricity supplies (e.g., interrupted services), then an industrial development park should be developed to overcome these problems. Relocation of existing firms into the park may improve the productivity, hence profitability, of these businesses. Specifically, a constraint to possible growth such as, the problems listed above, would be lifted by the construction of the park. If on the other hand, businesses within the community are not faced with such constraints to growth, firms will have little need to relocate into an industrial park. The result would be an investment in infrastructure (i.e., the industrial development park) with little or no impact on the rate of economic development and growth.

In summary, the importance of the ideas outlined in this section is best captured by Fox (1988):

New infrastructure investments should be used selectively as development tools because they will stimulate income growth in some rural communities and not in others. Infrastructure will probably have the greatest effect where other characteristics necessary for development are present and there is some shortage of existing infrastructure, but the potential for each community must be evaluated on its own merits.

Infrastructure investment as an economic development and growth policy option thus appears to be a conditional policy dependent upon a number of regional socioeconomic variables. The prior discussion on industrial development parks highlights this conclusion.

A SAMPLING OF STUDIES

To gain insight into the role of specific types of infrastructure in economic development and growth, a brief review of selected studies will be provided. A review of examples of both economic overhead capital and social overhead capital will be provided.

Review of Economic Overhead Capital

As described above, economic overhead capital tends to be fixed in a spatial sense in that the infrastructure is located in a specific geographic area and is not mobile. In this regard, the economic impact of an investment in this type of infrastructure tends to emanate from the site of the investment. For example, the construction and operation of a prison will benefit the communities immediately surrounding the prison. As one moves away from the location of the prison, the economic benefits decrease. Three types of economic overhead capital will be reviewed here: transportation modes, telecommunications, and water and wastewater.

Transportation

Because of the vast spatial areas characterizing rural America, transportation networks are viewed as perhaps the most important single type of economic overhead

capital affecting rural areas. Indeed, the economic health of many rural communities depends on the spatial link provided by the rural road network (Gillis, 1989). The lack of public transportation, rail, water or aviation contacts in most rural areas makes the rural road network particularly important. This importance is reflected in the voluminous literature examining the status of and investment in the rural road network.

In a review of the literature examining the economic benefits from highway investments, Henry et al (1989) observe that "(c)urrent research appears to agree that highway impact in the context of economic development, requires consideration of certain key elements." Again, the notions of Hansen and Fox come to the forefront. Transportation investments must be made with a clear understanding of the specific needs of specific locales. For example, Miller (1979) observed that limited empirical evidence suggests that rural areas with access to interstate highways experience continued expansion of job opportunities. Humphrey and Sell (1978) find that the impact of highway access is secondary to other variables related to rural economic growth. Briggs (1980 and 1981) found that the presence of a highway had little if any effect in remote, less developed rural areas.

In studies of firm location Dorf and Emerson (1978) found that access to interstate highways or water transportation systems was not necessary to attract small to medium-sized businesses. Yet, in another study of firm location, Smith, Deaton, and Kelch, (1978) found that access to a highway increased the likelihood of a firm locating in the region. Still, the authors found that several social overhead capital variables such as specific site characteristics and the quality of fire protection had a greater influence than highway access. Even more recently, Steinnes (1990) found that the infrastructure investment was important to the growth of rural manufacturing employment.

The work of Forkenbrock et al (1990) concurs with the bulk of the available literature: "(e)fficient transportation is essential to economic development in rural areas. But, what is adequate transportation for one area may be too much or too little for another."

Telecommunications

As society enters the age of information it is increasingly important that businesses have access to quality communication systems. Firms in rural areas that do not have equal access to the expansion of information service markets, will become economically uncompetitive (Parker, 1990; Schwartz, 1990). In addition, with the availability of adequate telecommunications, infrastructure information service firms, such as telemarketing, insurance and financial services, can locate in areas as well as urban areas (Bender, 1987; Smith, 1990).

In a review of the available literature, Parker (1990) concluded that the indirect benefits of investment in telecommunications for rural businesses and services far outweigh the cost of investment. Parker observed that benefit-cost ratios range from 5 to 1 to more than 100 to 1, based on the improved effectiveness of rural businesses. Most of the studies in Parker's review, however, looked at the benefits of introducing telecommunication services to areas previously not serviced. Estimating the benefits of improving existing telecommunication services is a more difficult problem.

Although limited empirical evidence suggests that an investment in rural telecommunication services is associated with positive net economic benefits, Parker is careful to note that "(i)n the absence of the other development activities, investment in telecommunication services for rural areas will not ensure economic development in those areas." Indeed, Kirn, Conway and Beyers (1990) note that "advances in telecommunication can be a two-way street for rural America. While telecommunications improvements increase a rural community's access to information and make it possible for rural businesses to more easily serve non-local markets, they also can make it easier for firms located in urban areas to serve rural markets via branch offices or through the telecommunications system."

Water and Wastewater

Rural investment in water and wastewater infrastructure is of particular concern for economic development on two fronts. The first centers on the necessity of investing in the construction or upgrading of existing water systems in order to comply with the provisions

of the 1977 Federal Clean Water Act as well as the 1986 amendments to the Safe Drinking Water Act. Second, as environmental mandates are imposed on businesses, the availability and safety of water systems will play an increasing role in firm location or expansion decisions. In a study of rural Missouri, Kuehn, Braschier and Shonkwiler (1979) found sufficient evidence to suggest that access to a quality water system played an important role in plant location. In addition, the availability of sewer services are increasingly important to land developers (Doeksen and Allen, 1990). In this regard, the lack of an adequate water system may place many rural communities at a comparative disadvantage.

This evidence, while limited, is particularly disconcerting for rural areas because most rural communities do not have adequate water systems. A recent national study of rural public water providers found that nearly 25 percent of surveyed communities were without any public water system (Stinson, Sullivan, Ryan, and Reid, 1989). In fact, many small businesses in rural areas obtain their water from private wells and dispose of their wastewater through private septic systems.

From Fox's perspective, the lack of adequate water systems in most rural areas may serve as a constraint on future economic development and growth. Investment in water systems as an economic development option, however, may or may not foster economic growth. In a review of the literature, Rowley, Grigg and Rossi (1990) conclude that "(t)here is no evidence that a shortage of water and wastewater facilities is the sole rural economic development problem." They continue by observing that "we cannot say that nationally distributed investments in rural water and wastewater will promote economic development, only that in certain situations they may." Again, the overall policy implication is consistent with the previously outlined concepts.

A Review of Social Overhead Capital

As described above, social overhead capital lacks a spatial dimension through its tendency to be mobile. In this regard, the economic impact of this type of infrastructure may not emanate from the site of the investment. For example, investment in a quality education system may produce a highly trained, very mobile labor force. The decision of the recipient of the investment to remain in the geographic area of the investment is usually beyond the control of policymakers. Still, not all social overhead capital is freely

mobile. For example, investments in community amenities such as parks and other recreational facilities are fixed in a spatial sense. Indeed, as businesses place a greater importance on quality of life as a location factor, investments in these types of infrastructure may play a greater role in development strategy (Blakely, 1989). For this review two types of social overhead capital will be discussed: human capital and health services.

Human Capital

Economists have long recognized the importance of education in worker productivity. It was not until the 1950s, however, that economists began to directly examine the role of investments in human capital (i.e., education) in economic growth and development. Since Theodore Schultz's (1961) seminal address to the American Economic Association, the conceptual and empirical work relating investments in education to economic development has proliferated (Smith, 1988).

While numerous studies relate the quality of the labor force (i.e., human capital) to economic development (e.g., Ross and Rosenfeld, 1988; Rudnicki and Deller, 1989; McNamara, Kriesel, and Deaton, 1988; Wasylenko and McGuire, 1985; Quan and Beck, 1987), the link between policy options and the improvement in the stock of human capital is tenuous (Hanushek, 1979 and 1986; Deller and Rudnicki, 1991).

The need for a quality labor force to promote and sustain economic development and growth is unquestionable. Therefore, investment in human capital to achieve a quality labor force appears to be a reasonable economic development option. At issue is the form of the infrastructure investment. Specifically, the education literature relating school inputs to enhancements in human capital is inconclusive at best. Although a comprehensive review of the relevant literature is beyond the scope of this paper, additional work in this area is needed.

An additional issue related to human capital investment policies in rural areas is the real increased likelihood of the out-migration of the newly trained labor force from rural areas. In a study of low-income Kentucky communities, Luytjes (1971) found increases in out-migration resulting from increased educational expenditures. As noted by McNamara,

Kriesel, and Deaton (1988), this out-migration may reflect labor's need to relocate to receive the desired increase in returns due from increases in human capital investments.

Consistent with investments in economic overhead capital discussed above, investment in human capital may or may not result in the desired economic development and growth.

Health Care

The recent crisis in rural health care delivery systems has increased interest in the role of quality delivery systems in economic development and growth. As noted by Doeksen (1990a), some researchers (Rosenberg and Runde, 1989; Christianson and Faulkner, 1981; Bauer, 1989) have discussed the link between health care and economic development and growth, but few have examined specific community impacts. Most studies examining the impact of declining rural health care systems have focused on the loss of a potential employment center (e.g., a hospital closing) as opposed to a decline in a specific type of social overhead capital (e.g., Doeksen, 1990a). The quality of rural health care delivery systems, however, may play a direct role in the productivity of the rural labor force. Empirical estimates linking the impact of declines in the rural health care delivery system on rural economic development and growth are lacking.

FUTURE DIRECTIONS

Throughout this review of infrastructure investments and economic development and growth, several needs have been identified. These needs may be described in terms of required research and outreach programming. Some of these needs will be highlighted here, and potential roles the Northeast Regional Center for Rural Development may play in fulfilling these needs will be identified. This discussion should be viewed as a stimulant to policy debate and not a final prescription for action.

Research Programs

Historically the definition of infrastructure and what constitutes infrastructure has been narrowly focused to include only those items characterized as economic overhead

capital. Research agendas must be defined in a broader sense to recognize the role of social overhead capital in economic development and growth. Many studies have identified the lack of investment in social overhead capital as a primary determinant of economic development and growth rather than a lack of investment in economic overhead capital.

Of particular concern in constructing research program methodologies is the problem of causation. As Doeksen and Allen (1990) note "(m)any studies have attempted to document the linkages between infrastructure and economic growth. Research exhibits a high positive correlation, but causality hasn't been firmly established due to statistical and empirical problems." When viewed in light of Hansen's three regions ('high,' 'medium' and 'low') it is easy to see where a statistical correlation may spur incorrect policy conclusions. Specifically, economic development and growth in 'high' regions promotes or causes a delayed investment in infrastructure, primarily to alleviate congestion. Yet, an investment in a 'medium' region may foster growth. The direction of causation is different across the two types of regions and many statistical methods cannot distinguish between the two cases. Research focusing on the causal relationship between infrastructure investment and economic growth and development is duly needed.

Also of particular importance is the conceptual and practical problem of measuring the stock of infrastructure. If the correct output of an investment in infrastructure is the resulting flow of services from the infrastructure, traditional measures are lacking. For example, government expenditures on infrastructure are commonly used as a measure of the stock of infrastructure. Expenditures may vary directly or indirectly with the flow of services. Poorer quality roads require higher expenditure levels than roads in good condition to maintain a minimum flow of services. Regional variation in cost of living further compounds the use of expenditure data. Therefore, research examining the relationship between infrastructure and economic development and growth must fully consider the problem of infrastructure measurement. Much of the available literature is deficient in this area.

An additional issue of increasing importance given Reagan's legacy of fiscal federalism, is the ability of local levels of government to provide the resources necessary to maintain current levels of infrastructure and invest in new infrastructure. In addition, whether or not local officials have the technical experience to provide these infrastructure services in an economically efficient manner is a fundamental question. Some have argued

(e.g., Hulten and Peterson, 1984) that better facility management may substitute for capital outlays. Whether small rural governments can effectively provide the quantity and quality of infrastructure services required of potential economic development and growth in a cost-effective manner is questionable. Indeed, in a study of rural midwestern townships, Deller and Nelson (1991) present evidence that suggests that nearly 50 percent of road maintenance costs may be unnecessarily incurred due to managerial inefficiency. Given the ponderous nature of small town government in the Northeast, the issue of managerial capacity is of particular importance. The potential savings from alternative institutional arrangements must be examined.

Perhaps the single most important researchable issue flowing from the current consensus of the role of infrastructure in economic development and growth focuses on identifying the potential for growth in individual locations. As observed by Sears, Rowley, and Reid (1990), many rural communities fall into Hansen's definition of a "low" region. Investment in either economic or social overhead capital in these regions may have little if any economic impact. An understanding of these regions is a fundamental first step toward effective infrastructure policy. Alternatively, a fuller understanding of the constraints inhibiting the economic development and growth of a particular community or region would be beneficial. The location of specific types of infrastructure in a ranking of these constraints to growth would lend significant insight into the potential benefits of infrastructure investment.

The highlights of these suggested research issues may be summarized as:

- A broader understanding of the scope of infrastructure to include both economic and social overhead capital.
- The issue of causation in assessing empirical relationships as they pertain to developmental policy prescriptions.
- Alternative measures of the quality and quantity of the stock of infrastructure.
- Alternative institutional arrangements for the provision of infrastructure services and management practices.
- Identification of a consistent method for assessing the potential for economic development and growth.

In the development of research agendas, not only the testing of empirical hypotheses but the practical needs of stakeholders should be attended to. Specifically, the products of research programs should address realistic problems faced by local communities. University extension personnel can be particularly helpful to the researcher by helping to identify needs and assisting in problem formulation.

Extension Programs

In a paper presented at a meeting of the American Agricultural Economics Association, Doeksen (1990b) provided an overview of the role of extension in infrastructure provision. Doeksen identified four potential roles for extension personnel: (1) leadership education, (2) information dissemination, (3) technical assistance for specific projects, and (4) technical assistance for overall infrastructure investment planning.

Doeksen argues that effective infrastructure planning at the local level requires effective leadership, not only in terms of assessing local infrastructure problems but also in terms of managing major infrastructure investment projects effectively. Infrastructure investment also requires the organization of diverse community resources. Sokolow and Spezia (1990) compare local leaders to entrepreneurs with respect to the needs and objectives of economic development. The prerequisites for successful entrepreneurs often mirror the requirements for successful action within the public setting. Unfortunately, rural leaders often lack the capacity or will to accomplish the task (Sokolow, 1981; Seroka, 1989). Extension has demonstrated a comparative advantage in leadership education programming in rural areas. This effort should continue, with special attention paid to infrastructure issues.

A central mission of extension is the dissemination of information to relevant policymakers. Doeksen notes the wide range of diverse agencies and groups that provide information relevant for infrastructure issues. These groups range from state departments of transportation to the Environmental Protection Agency and the Farmers Home Administration. Often local officials are at a loss to screen and evaluate the volumes of information provided by these diverse groups. A potential role for extension is to serve as a clearing-house for the relevant information, channeling specific information to the relevant players for specific infrastructure issues.

As noted earlier in the paper, the ability of local officials to raise the revenues necessary to finance maintenance schedules and investment plans is often limited. Revenue sources such as user fees and special grants, however, are viable options. Local officials are often unaware of such options or may be reluctant to use them. By encouraging local officials to consider alternative funding sources, barriers to much needed additional resources may be lifted.

Local infrastructure issues are usually addressed singly. For example, problems related to fire protection will be addressed separately from street problems. Extension personnel can provide technical assistance for specific infrastructure issues as they arise. Such assistance may range from investment decision information to financing information.

In addition, many rural communities attempt to develop comprehensive plans that outline the desired direction local residents wish the community to take. A significant component of many of these plans is capital improvement planning (CIP), or long-term infrastructure investment planning. Extension personnel may be able to provide insight into alternative potentials and developmental options. Alternatively, extension personnel may be able to foster a community's interest in developing a comprehensive plan by teaching local leaders the advantages of capital improvement planning.

The highlights of Doeksen's concepts of the potential role of extension in the infrastructure issue are:

- | Leadership education with respect to effective policy planning and program execution.
- | Information dissemination to the relevant local policy makers.
- | Technical assistance in specific infrastructure investment decisions.
- | Technical assistance in capital improvement planning.

In applying these suggestions for future directions in the Northeast, special attention must be paid to future structural needs. Given the current emphasis of extension specialists in the Northeast, a regional approach may be the most effective structure for technical assistance in the provision of infrastructure services. For example, a multi-disciplinary team of extension specialists could provide educational programming in several states. Of course, extension administration must be flexible in encouraging and allowing such a network to evolve. This approach is being examined

in the six New England states. If successful, the paradigm should have high transferability to other geographic areas.

SUMMARY

The status of rural infrastructure throughout the U.S. is cause for concern. Increasing demands placed on the current stock of infrastructure are not being adequately compensated for with increased public and/or private resources. In some areas, the current stock of infrastructure is a barrier to higher rates of growth in economic well-being and overall quality of life. Current understanding of the links between investments in infrastructure and economic growth and development is limited. In order to make effective use of limited resources, a more complete understanding of current needs and potential benefits is required.

The task awaits the allocation of human, economic, and temporal resources from extension and research units within the Northeast region. Moreover, these resources must be linked between research and extension efforts and with those outside the land-grant system if any impact on policy formulation, economic growth and development and the quality of life are to be realized in the 1990s.

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THE KEY FACTORS IN THE COMMUNITY'S SOCIAL AND PHYSICAL ENVIRONMENT THAT ENHANCE SUSTAINABLE LOCAL ECONOMIC ACTIVITY

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INTRODUCTION

This paper, as well as the other three papers presented for this topic, was commissioned within the context of a set of discussions at the national and regional levels focusing on a renewed interest in rural development. The participants at the national level are the National Association of State Universities and Land Grant Colleges (NASULGC), the Experiment Station Committee on Organization and Policy (ESCOP), and the Extension Committee on Organization and Policy (ECOP). At the regional level leadership and support for these discussions have been provided by the Northeast Regional Center for Rural Development (NERCRD).

One belief that is a premise for all of these discussions is that the land grant system is in a position to make a significant contribution to rural development. In "Revitalizing the Rural Economy," NASULGC argues that "the land grant universities have made outstanding contributions to the success of American agriculture. Now with the same mandate and commitment for revitalizing rural America they can make a new and outstanding contribution to a competitive national economy" (National Association of State University and Land-Grant Colleges, 1990). ESCOP in its report entitled "Agriculture and Rural Viability," states "as we prepare to close the books on the land grant systems remarkable record of accomplishment during the 20th Century, one great challenge remains. Through extension, research, and instruction, we must improve the viability of agriculture and rural America" (The Task Force on Agriculture and Community Viability, 1988). The following quote is from a report to ECOP entitled "Extension in Transition: Bridging the Gap Between Vision and Reality." Land grant institutions, however, cannot rest on their past achievements. The structure of society is changing, and problems and

needs are changing" (Futures Task Force 1987). Finally, the Northeast Regional Center for Rural Development's report entitled "Redirection for the 90s" states that "the research and extension arm of the land grant university system are uniquely well adapted and explicitly chartered to serve rural America" (Northeast Regional Center for Rural Development, 1990). The unanimous opinion of the reports cited above is that the land grant system has effectively addressed the problems of the agricultural sector. They also all agree that the land grant system is not currently well-positioned to deal with the problems of the broader rural community. In fact, the essence of the reports cited above is a set of recommendations dealing with organizational changes, training of extension workers, and suggested new research agendas. These recommendations are designed to better position the land grant system to deal with a wide spectrum of problems in rural communities.

Perhaps the most common recommendation flowing from these discussions and reports relates to the need to develop rural information systems. Orville Bentley, writing in the NASULGC report on the "New Allegiances for Rural Economic Development," states that "we need a philosophy for thinking about rural development and then construct the necessary information system to carry out that philosophy" (Northeast Regional Center for Rural Development, 1989). The ESCOP Committee Report argues that "everyday decisions are being made that affect the viability of rural America as a place to work and live. Unfortunately they are being made without adequate knowledge of the social and economic processes affecting agriculture and rural communities. A much better understanding of these processes is necessary to maintain and improve life in rural America, to increase income, and to secure jobs in the future. Farmers, citizens, community leaders, and local, state, and Federal officials know that they need this information" (Futures Task Force 1987). According to "Revitalizing the Rural Economy, community leaders, business people, farmers, local and state officials, and other deeply concerned rural citizens are asking serious questions about the future of rural America and the people and institutions that hold it together. If rural America is to be revitalized, they need to find answers to these tough questions" (National Association of State Universities and Land-Grant Colleges 1991). Thus, one of the tasks that must be accomplished before the land grant system can play a key role in the revitalization of rural America is the development of a rural information system.

The objective of this paper is to identify the type of information system necessary to deal effectively with one narrow aspect of rural development, namely, sustainable economic activity. The second objective is to provide an extensive review of existing information associated with the economic viability of rural communities. The final objective is to compare the required information

base to the existing information base and thereby identify gaps that can be addressed in future research undertakings. The following section contains a brief review of the key elements of an information system. Section III discusses the conceptual foundation for a rural development information system. Sections IV, V, and VI contain a review of the literature in three categories. Specifically, section IV addresses the location determinants of basic economic activity; section V addresses the location determinants of service activities; and section VI reviews literature dealing with the stability of economic activity in rural communities. In section VII the major gaps in our information base are identified.

ELEMENTS OF A SUCCESSFUL INFORMATION SYSTEM

An Information System Paradigm

Before discussing the elements of the information system required to enhance our ability to revitalize rural areas, it is useful to briefly review a paradigm and discuss the elements of an information system. Figure 1 is reproduced from an article by Bonnen, (1975) in which he discussed the information system that has been the basis for agricultural and rural policy. The first important point is that the information system contains a data system and an inquiry system. At the bottom of the diagram is reality. Next are the theoretical concepts used to simplify reality.

On the data system side of the diagram, the next step is the operationalization of concepts. Bonnen (1975) defines operationalization as the process of defining variables. A good variable is one that is highly correlated with the concept. Obviously the correlation he is speaking of has to be subjective because theoretical concepts are abstractions and cannot be measured. The definition of variables is the process of identifying parts of reality that are going to be counted. The next step in the data system is measurement, or the process of counting that part of reality identified in the variable definitions stage.

On the right-hand side of the diagram is the inquiry system. The first two steps in this inquiry system are identical to those in the data system. For example the theoretical concepts associated with the consumption function would lead to the hypothesis that the consumption of food is positively related to income levels. To test this hypothesis we first have to operationalize the concepts of income and food expenditures. The next box in Bonnen's paradigm involves specifying a particular statistical model and utilizing the data output to test this hypothesis empirically.

The research results are combined with data in such a way as to be understandable to the decision maker. The important point is that the research output produced by the inquiry system is not useful at this stage to the decision maker. The important and often major tasks of interpretation and analysis remain before useful information is generated.

The Elements of and the Division of Labor Used in a Successful Information System

Several quotes were provided in the introduction to this paper which testified to the success of the land grant system in dealing with problems in the agricultural sector. This success was undoubtedly due to the fact that the land grant system has been able to develop and deliver an information system to farmers that helps them make key decisions. An example of such an information system is the farm management techniques that assisted farmers in making a wide variety of decisions concerning enterprise combinations, appropriate input levels, investment decisions, and so forth. It is useful to briefly review the essence of this successful information system and identify key players in order to develop parallels for the information system that needs to be developed to help nonagricultural sectors of rural economies.

The first step in generating an information system for farmers was to test hypotheses concerning the theoretical concept known as the production function. This process involves the inquiry system section of Bonnen's framework. Although production economists have command of the theoretical concepts and analytical skills required to specify and test the production relationships, they did not have the appropriate data. Specifically, agronomists, plant scientists, and so forth were in the business of testing alternative seed varieties utilizing various fertilization rates under different climatic conditions. Thus, the production economist depended on an entirely different set of scientists for the data needed to test the production relationship. Bonnen's diagram clearly indicates that the data system and the inquiry system have to be built upon the same conceptual foundation. Thus, the production economist and the agronomist must operate from the same conceptual base. This, of course, required a rather close working relationship between the two disciplines.

The production economist, working with other scientists, empirically specified a number of production relationships. The production economist now had the information required to prepare a

publication for a professional audience, but the information in this form was of little use to the farmer. However, a farm management specialist familiar with linear programming and computer operation saw the possibility of developing computerized linear programming systems that could be used to simulate the conditions on individual farms and provide farmers with guidance in the decision-making process.

Completion of the linear programming model did not make it possible to provide information to the individual farmer. Before the information would be useful to the individual farmer, the program had to incorporate a variety of data about the individual farm. For example, information on the size of the farm, soil types, climatic conditions, and input and output prices had to be obtained before the linear program could generate a set of recommendations relevant to the individual farm. Incorporation of this type of data into the programming model would in fact generate a set of recommendations that applied to a specific farm. Often the task of working with the individual farmer was handled by county based extension staff. Typically the county extension agent was trained in the "hard sciences" and thus the farm management specialist would be called upon to provide training sessions for the county extension workers primarily in the area of farm management economics. The success of this information system involved multidisciplinary teams and a high degree of coordination among the agronomist, production economists, the farm management specialist, and the county extension workers.

An Information System Relating to Sustainable Economic Activity in Rural Communities

The term sustainable economic activity implies both a minimum level of employment and stability in that employment level. Thus, the rural economic information system should focus on how communities can attract firms that will provide stable employment opportunities.

The parallels between this information system and the farm management information system are profound. Many agricultural economists are well trained in the subdiscipline of industrial location theory. They deal with a set of theoretical constructs that adequately represent a major part of reality. However, the location economist is typically not prepared to operationalize many of the concepts associated with industrial location theory. Good operationalization of many of the concepts of industrial location theory requires interdisciplinary and intradisciplinary approaches.

For example, modern location theory suggests that community attributes may be important in determining the location of economic activity (Greenhut, 1956). For example, the quality of health care in a community may affect the community's ability to attract plants in certain industries. However, the typical industrial location economist is not in a good position to define a variable that would adequately reflect the concept of quality of health care.

Even if a multidisciplinary team was successful in empirically implementing a location model, no information would have been generated that is useful to the county planner, the chairman of the local industrial development corporation, or the Chamber of Commerce Task Force on Industrial Recruitment. As Waslenko and McGuire (1985) have pointed out, it does not do the Governor of Pennsylvania any good to be told by a location economist that states with high corporate tax rates have more difficulty attracting new plants than do states with low tax rates. You also must tell the Governor how Pennsylvania compares to other states with respect to corporate tax structures. Waslenko and McGuire reported on a study that did establish a negative relationship between corporate taxes and incidence of industrial locations. However, their data also showed that Pennsylvania had moderate corporate tax levels, and public officials should not use the existing tax structure as an excuse for the poor economic performance of the Pennsylvania economy. Thus, just as the farm management information system required a farm management specialist to build upon the work of the production economist, there must also be a state rural development specialist to build upon the work of the location economist. Specifically, the results of the analysis by the location economist must be combined with data about the unique aspects of an individual community, and the appropriate interpretations made.

In summary then we should not be puzzled by the type of information system required if we truly want to make a commitment to rural revitalization. A paradigm of an appropriate information system is well understood and the land grant system has successfully implemented this type of information system in the past. What is missing at this point is a commitment from land grant institutions to the development of such a system.

A THEORY OF SUSTAINABLE ECONOMIC ACTIVITY

A conceptual model is the beginning point and foundation of the information system outlined in the Bonnen paradigm. In essence this is what Orville Bentley was calling for when he argued

that "we need a philosophy for thinking about rural development" (Northeast Regional Center for Rural Development, 1989). In the following section of this paper, it is argued that export base theory provides this philosophical or conceptual base for a rural information system.

Export Base Theory

Export base theory holds that the life blood of the community is its ability to produce goods and services that are sold to customers outside the community (exports). The income and profits generated within firms producing export goods generate a demand for inputs that can be supplied locally and for consumer goods and services. The clear implication of export base theory is that if a community wants to grow, it must concentrate on expanding the quantity of goods and services it exports. This theory of community growth was first given empirical content by Tiebout (1956) in his classic "export base studies." Later, the more detailed input/output studies pioneered by Leontief (1960), for one, embodied the basic elements of export base theory. Export base and input/output studies provide the dominant empirical content of domestic development literature. Despite notable arguments to the contrary, this dominance implies a near universal acceptance of the basic elements of export base theory (Edwards 1976).

Much of the criticism of export base studies relates to disagreement over variable definition rather than theoretical content. Early export base studies tended to define export or basic activities as mining, manufacturing, and agriculture. At the time of these early studies this definition of basic activity may have been based on two considerations. First, it probably captured the majority of the reality. That is, in the 1950s the majority of the export activity in communities may have come from one of these three sectors. Second, defining basic employment in this way made it very easy to measure the variables using existing secondary data. However, the economic structures of the United States and its communities have changed dramatically since those early export based studies. Many of the growing communities today have little or no economic activity in the mining, manufacturing, and agricultural sectors. Perhaps the polar example of this is suburban communities. The dominant export for many of these communities is labor. Thus, the basic elements of export base theory still apply. The problem is that we must completely redefine what basic economic activity is, a task which presents important empirical difficulties.

In conclusion, export base theory is widely accepted as the basic mechanism by which community growth and decline take place. Although notable arguments have been made about the

shortcomings of export base theory, most of these relate to operationalizing the theory rather than the theory per se. The major substantive shortcomings of export base theory relate to its lack of dynamics. The shortcomings notwithstanding, export base theory provides a quite acceptable conceptual base for a rural economic information system.

Location Determinants of Export Activities

The obvious implication of export base theory is that community growth and decline is a direct function of the growth and decline of the export or basic sector. Within this context understanding community growth involves understanding the community's ability to attract export activities. The important point at this stage of our economic evolution is that we must broaden the economic sectors recognized as providing the economic base of many rural communities.

Export activities were defined earlier as mining, manufacturing and agriculture. These three sectors do constitute the major portion of the export base of many rural communities and deserve continuing attention. The decentralization of manufacturing activity over the last four decades has resulted in its being the dominant basic activity in many rural communities. The declines in the mining sector, combined with its migration from the Northeast to the Mountain states, have clearly been the cause of economic decline in many rural communities in the Northeast. Changes in the structure of agriculture in terms of both farm size and inputs purchased, may have had important consequences in communities where agriculture is an important part of the economic base. As Vail (1985) has argued, agriculture is not likely to be the lead sector in revitalizing rural communities but changes in the structure of agriculture may have contributed to the growth of some communities while simultaneously contributing to the decline of others.

Recreation activities are an important part of the economic base of many communities in the region. Understanding the locational attributes of recreational activities is an important consideration in the Northeast. Recreational activities are generally considered to have high income elasticities. The large population in the Northeast would suggest that recreational industries may be a major source of employment growth in its rural areas.

In the last decade or so, retirement income is an important part of the economic base of many rural communities (Bender 1987). Social security payments and retirement plans bring outside dollars into the community in much the same way as would exporting a bushel of corn.

Similarly, the export of employed workers from a community may be an important component of a community's economic base. The idea of rural communities becoming bedroom communities for a regional growth center may represent a real policy option in the near future. Many rural communities are losing their mining and manufacturing base. Their best opportunity for surviving may be to begin exporting labor to regional growth centers.

Many rural communities are increasingly recognizing that services activities provide an important part of their economic base. Bender (1987) has documented this fact and argues that services activities should receive equal attention to the more traditional mining, manufacturing, and agricultural activities in community development plans. Stephen Smith (1984) has also clearly documented that much of the service sector employment in rural areas is in fact exported from the rural community.

A variety of other types of economic activity may constitute important parts of the economic base of rural communities. Notable among these are government installations, higher education and hospital facilities presumably. Location decisions for these types of activity have a major political component. However, the location of these types of activities is very important to selected communities and understanding that process could facilitate our understanding of rural community growth.

In summary, a wide variety of economic activities can constitute the economic base of rural communities. Kuehn and Bender (1985) have made a major step forward in classifying the economic base of communities. What remains is to identify the locational attributes of a variety of economic activities in order to effectively assess a community's strengths when seeking to increase its economic base.

Employment Stability

While most of the focus of export base theory is on levels of economic activity rather than variations in economic activity, it is clearly well within the spirit of export base models to focus attention on the stability of the existing economic base as well as on methods to attract new basic activities. For example, it is as important to identify the types of communities in which a basic activity is likely to expand as it is to identify the type of community that may attract a new plant

to its economic base. Similarly, it is important to devote attention to the retention of existing economic activities.

The following sections of the paper contain a review of the literature in each of these three major categories that is, literature relating to the location determinants of basic economic activity, both manufacturing and nonmanufacturing, and the stability of basic employment.

A REVIEW OF STUDIES DESIGNED TO IDENTIFY THE LOCATION DETERMINANTS OF BASIC OR EXPORT ACTIVITIES

It was argued earlier that a wide variety of economic activities may be engaged in export activities. In this section, studies will be reviewed that have attempted to identify the location determinants of various types of export activities. In general researchers have used two methods to identify these determinants. The first is referred to as the survey method. The essence of this methodology is to ask plant officials to rank the relative importance of the factors in their location decision. The second methodology typically involves the use of secondary data and various statistical models. Typically these models have dependent variables that reflect industrial starts or changes in employment. The independent variables in these models are designed to reflect the communities various social, physical, and economic characteristics. In general, these two methodologies are not differentiated in the review presented below. When the different methodologies are believed to affect the results of the research significantly, they are discussed.

Location Determinants of Manufacturing Activity

Table 1 summarizes the studies involved in this section. The X's in the table indicate that a particular variable (the column headings) was found to be an important determinant of location in the study associated with each row of the table. The verbal discussion of this literature will focus on the columns of Table 1.

1. Labor

The studies reviewed here typically use variables reflecting some dimension of labor supply. The three most prominent dimensions of the labor variable are the quantity (labor availability), quality (human capital), and unionization of the work force (labor influences).

Labor Availability

The three most typical variables used to reflect labor availability in these studies were a measure of the aggregate labor supply, measures of the unemployed labor supply, and the wage rate. The typical pattern was for the wage rate not to be a significant industrial location determinant. The main reason for this is that almost universally aggregate wage rates for manufacturing sectors rather than wage rates for specific occupational classes were used. Measures of the unemployed labor force tend to show a mixed pattern. It is becoming increasingly obvious that the unemployment rate does not take account of the discouraged worker and therefore does not do a good job of reflecting the magnitude of the unemployed labor force. Measures of quantity of labor force such as the number of people ages 16 to 64 have generally been an important determinant in models analyzing aggregate manufacturing location. However, this variable has not typically been an important explanatory variable in models that look at specific industries.

2. Human Capital

Human capital measures such as the proportion of the population 25 years old and older that have a high school education are becoming increasingly important as a location determinant for manufacturing activities. The studies reviewed here come largely from the last five to seven years. It is obvious that the importance of the human capital variables has increased dramatically over similar studies that were conducted in the 1970s. This variable is significant across a broad range of industrial location studies.

3. Unionization

Very few studies have looked at the relationship between unionization and the location of manufacturing activity because unionization data are difficult to obtain. This is particularly true at the substate level. The only studies we found that looked at the unionization variable were those that used states as the unit of observation. In these studies, the effect of unionization on the location of manufacturing activity was negative. Wheat's (1986) study found that unionization was the fourth most important variable in explaining industrial location. Bartik (1985) concluded in his 1985 study that "the union sympathies of states have a major affect on business location."

4. The Importance of the Labor Factor in Studies Using the Survey Method

The role of labor in location decisions is much more conclusive in the studies using surveys of plant officials than in the studies utilizing secondary data. Typically, the labor variables are ranked near the top in studies utilizing the survey method. For example, the Bowlby study (1988) found that among 20 location determinants, labor pool was identified as being the most important determinant in their location decision by respondents. Similarly Smith and Borowski (1985) found in their study of high tech manufacturers that the availability of a trained labor force was an important determinant. For some reason, unionization questions are not frequently used in studies using the survey method.

Intermediate Input Availability

Only two studies using secondary data included variables that reflect the availability of intermediate inputs. The Harrington study (1985) which focused on the semiconductor industry found that this industry tended to locate in proximity to other manufacturing establishments in the electrical equipment industry. Hastings and Goode (1982) developed measures of the availability of specific inputs. In general this variable was significant in explaining the location of many manufacturing industries. The major reason why more studies do not include variables reflecting these interindustry link because the nature of these links is very specific and the data requirements are severe. On the other hand, most survey methods find that the availability of intermediate inputs is identified by plant owners as an important factor in their location decision. In his study, Bowlby (1988), found that accessibility was the second most important factor identified by plant owners. Taylor and Hirsch (1985) also reported that the availability of materials was the second most important factor in their study. On the other hand, Galbraith (1985) found in his study of high-tech industries that proximity to inputs was at best a secondary consideration. Thus, additional research is needed to clearly determine the role of interindustry links in the location decision of manufacturing firms. However, the limited evidence suggest that proximity to inputs that are expensive to transport does play a role in the location decision.

Market Access

Most location studies do include variables reflecting spatial variation in markets. In studies that utilize large units of observation such as states or metropolitan areas, typical variables used to reflect market potential are population density and per capita income. Bartik (1989), Wheat (1986), and Wasylenko and McGuire (1985) all used this market variable and found it to be an important explanatory variable in explaining industrial location.

On the other hand, most studies of rural industrial location use distance to the nearest SMSA as their measure of market potential. This variable has generally not performed well in rural industrial location studies. Goode (1986) has developed a variable that incorporates both consumer and producer demand in a region surrounding the rural community. This variable performs well in industrial location models and indicates that market access is an important location determinant for selected industries.

Surveys of business owners show that market access tends to be a lower ranked location factor. For example, Johnson (1989) found that access to customers was ranked 13th of 26 factors by managers of new businesses. Galbraith and De Noble (1988) in their survey of high-tech manufacturers found that access to customers was clearly a secondary location determinant.

In general, the literature suggests that market potential is a moderately important determinant of the location of selected types of manufacturing firms. It can be argued that consumer oriented manufacturing firms locating in the metropolitan areas and as a result are responding to per capita income and population densities. Almost by definition rural manufacturers do not have strong consumer market ties and are responding more to interindustry linkages. As theory would suggest, high tech manufacturers whose products are relatively inexpensive to transport do not have strong market ties.

Social and Demographic Factors

Most of the social and demographic factors used in industrial location studies reflect various aspects of the labor supply. However, two important social and demographic characteristics have received considerable attention in statistical studies of industrial location. The first of these variables, community size, reveals an interesting pattern in the literature. Community size is positively associated with manufacturing growth when the studies focus on metropolitan areas. Generally, when the studies focus on industrial development in rural communities the community

size variable is insignificant. For example, in his study of metropolitan areas Moomaw (1985) found that population size was an important determinant of growth in most manufacturing sectors. On the other hand, the McNamara et al. study (1988) of rural communities was the only example of rural industrial growth that found a positive relationship between community size and growth. In his study of selected manufacturing activities in nonmetro counties, Smith (1984) generally found population to not be an important explanatory variable. Smith et al. (1988) in their study of nonmetro growth also found that population was not a significant factor.

The second important demographic variable included in several studies is race. Till (1987) in his study of manufacturing growth in the South concludes that manufacturing growth has not bypassed counties that have large black populations but does conclude that counties having high proportions of white residents have benefitted more. McNamara et al. (1988) have found that the proportion of the population that is nonwhite is not a significant factor in explaining industrial location. In contrast, Harrington (1985) found that the proportion of the population that is nonwhite was actually positively associated with industrialization. In summary, then, it appears that the size of the nonmetro community is not a significant determinant of the rural community's ability to attract manufacturing employers, nor does there appear to be a racial bias in industrial location.

Taxes and Business Climate

Most studies that look at the relationship between business climate and industrial location use tax rates as their measure of business climate. The argument concerning the relationship between tax rates and industrial location appears to have come full cycle. Twenty years ago it was argued that tax rates played a major role in the industrial location decision. In the intervening years the conventional wisdom was that taxes were at best a marginal consideration. However, several of the studies reviewed for this paper found strong negative relationships between taxes and industrial growth. Bartik (1989) found that property and income taxes were negatively associated with employment growth. In another study, Bartik (1985) found that corporate income taxes and business and property taxes were both associated with low industrial growth rates. Wasylenko and McGuire (1985) found that changes in a state's tax effort was a very strong negative influence on industrial growth. Dorf and Emerson (1978) in their study of the Midwest concluded that taxes are of secondary importance in explaining rural industrial development. Finally, McNamara et al.

(1988) did not find local real estate taxes to be an important determinant of industrial location in the Southeast.

Significant empirical evidence suggests that taxes do play a role in the industrial location decision. However, a much more careful study of the incidence of particular types of taxes is required as well as an investigation of the effects of those taxes that fall largely on businesses as an explanatory variable in industrial location. For example, real estate taxes for businesses will have very little impact on manufacturing activities that do not involve significant amounts of plant and equipment. However, no study reviewed in this paper has attempted to investigate the relationship of specific types of taxes to the location of specific types of industry.

Industrial Development Groups

Perhaps one of the most common activities engaged in by local communities is the formation of industrial development organizations. Several studies have looked at the relationship between the existence of industrial development groups and industrial location. The results are somewhat mixed. For example, McNamara et al. (1988) found that the existence of a locally funded development group was positively associated with industrial locations. Rubin (1986) was considerably less successful in his attempt to identify a positive effect of industrial development groups. His model formulated that the major impact of industrial development groups is to increase the activity of local government to attract industry. In turn, local government actions are instrumental in attracting new industry. His study did suggest that industrial development groups do increase the industrial recruitment activities of local governments. However, the relationship between local government activities and employment growth was very weak.

The most comprehensive study of the effects of development groups was undertaken by Humphrey et al (1988). In this study, an attempt was made to look not only at the relationship between development groups and industrial location, but more specifically at the types of activities undertaken by development groups. The results of this study are best summarized in the authors' words: "Moreover, one would have to wonder why local industrial development groups spend as much time and effort as they do in their quest for development given the relative impotency to counter the national and international forces reshaping local economies throughout the United States during these years." Thus, the role of industrial development groups and the activities they

typically undertake appears to be of limited usefulness in attracting new manufacturing establishments.

Industrial Characteristics (Agglomeration Economies)

In the 1950s and 1960s, conventional wisdom suggested that rural communities would not successfully recruit manufacturing activities because agglomeration economies were so strong that manufacturing activities could operate profitably only in larger communities. In the late 1970s, it was realized that manufacturing activity was in fact decentralizing from large cities to rural areas. Part of the explanation for decentralization was the decline of the role of agglomeration economies. Almost by definition, the decentralization of manufacturing activities did imply that the agglomeration effects were not strong. However, a study by Goode (1986) suggests that new plant locations in rural areas tend to occur near existing plants in the same industry. The literature on the role of agglomeration economies is quite mixed. For example, in one of his studies, Bartik (1989) found that industrial density was actually negatively associated with industrial development. In another of his studies, he found that the level of manufacturing employment existing in an area was positively correlated with industrial development (Bartik, 1985). Wasylenko and McGuire were unable to find a relationship between the number of manufacturing employees per square mile and the location of manufacturing activity.

It would appear that agglomeration economies still play a role in the location of certain types of manufacturing activity. Studies conducted at the aggregate level (either geographically or industrially) are unable to pick up the effects of agglomeration economies.

Other Community Attributes

The other community attributes listed in Table 1 generally have not been the focus of attention in industrial location studies and are discussed only briefly here.

The role of energy availability and prices appears to be less important in recent years. Many of the studies shown in the table were conducted in areas where self selection had focused on energy consuming industries and probably do not provide a very good representative sample for judging the importance of energy availability.

Another paper presented in this series looks at the physical attributes of communities, so this subject will receive only brief mention here. The impression left in the literature is that no single type of infrastructure and/or public service plays a dominant role in industrial location decisions. However, it is suggested that when indices can be developed that reflect a general availability of infrastructure and public services, these factors do enter the industrial location decision. Particularly important among these seem to be indices that include the quality of education and the complexity of the community's service sector.

Transportation services tend to be ranked moderately high in surveys of business owners. In statistical studies the only times that transportation appears to be important is when the studies look at rather specific industries. For example, rail service may be essential to a few specific types of industries. However, when the industrial location studies utilize aggregate industrial categories for large geographic areas, the transportation variables are typically not significant.

Access to universities does not appear to be an important determinant of industrial location. In those studies that do an adequate job of reflecting the human capital in the labor force, proximity to universities generally is not a significant explanatory variable. The idea that manufacturing firms rely upon universities for expertise does not have strong support in the empirical literature.

Nonmanufacturing Export Activity

There is almost no literature concerning the location determinants of other types of export activity. We were unable to find a single article relating to the location patterns of mining, recreation, or retirement activities. We found one article relating to the location of the poultry industry (Germer and Replogle, 1988).

Somewhat surprisingly there is a considerable amount of interest in the location of health care facilities. Schoenman and Sloan (1986) looked at the location determinants of doctors. Vitallano (1988) developed a model to analyze the spacial positioning of hospitals in order to minimize treatment cost and hospital related travel cost. Erenburg and Schuldt (1986) looked at the location determinants for headquarters of nonprofit corporations. Their findings suggest that nonprofit corporations location is determined primarily by available facilities, employee factors, and availability of transportation. Winter (1986) developed a computerized system to identify the

optimum locations for health care facilities. Cordes (1989) argued that diversity among economic structures of nonmetro counties is greater than for metro counties, and accordingly that the health care delivery systems in rural areas need to be more diverse as well. Siegner (1986) made a similar argument: rural hospitals need to recruit young well-trained doctors and diversify their services to recapture their market share.

LOCATION DETERMINANTS OF SERVICE INDUSTRIES

The evidence is quite clear that service establishments can play a major role in the economic base of rural communities. Bender (1987) states, "The data are very clear that services employment has increased throughout the rural economies in the nation." Kuehn and Bender (1985) recognizing the diversity of economic bases for nonmetro areas, have developed a classification system in the hope that policies that are successful in communities with a specific type of economic base can be transferred to similar communities elsewhere. Smith (1984) in his study of the export orientation of nonmanufacturing businesses concluded the following: "This study found that nonmanufacturing businesses do indeed form a part of the export base in these communities. This finding plus the growth potential and other advantages of these businesses leads to the conclusion that they can reasonably be included with manufacturing in employment generation and economic development programs." Glasmeier and Borchard (1989), in their review of the literature, believed the prospect of rural services growth was not as optimistic. They argue, "As the still labor intensive low operations quickly automate to reduce production costs, jobs appropriate for most rural communities may soon evaporate. Therefore, rural areas should use caution in pursuing a service development strategy."

Despite the potential of employment opportunities in services sectors in rural areas, we cannot locate a single study that systematically looked at the location determinants for services industries. Only two studies systematically examined the location of services industries and both were in an urban setting. Anikeeff (1990) investigated the optimum location for car care centers in neighborhood shopping centers. Fox (1986) looked at the effect of differential tax structures on distorting the location of retail sales and employment along state boundaries.

The location of service activities appears to be a fertile field because so little has been done in this area. However, considerable preliminary research will have to be conducted to develop acceptable classifications for services. For example, residential, business, and export service

activities will have to be defined and measured before the determinants of service industries can be studied effectively.

EMPLOYMENT STABILITY

In recent years, it has become increasingly obvious that rural communities are concerned about both the stability and level of their economic base. This concern about stability was prompted at least in part by the fact that many rural communities made significant investments and granted important tax concessions to firms that would locate in their community. In many instances after the concession period ended, the firm would move to another community where similar concessions were provided. There is a growing literature on this topic and three factors have been used to explain stability--namely, economic structure, plant characteristics, and community economic factors.

The economic structure approach attempts to identify particular economic structures that are more stable both in the short and long run than other economic structures. In their study of nonmetro counties, Brown and Pheasant (1987) found that those counties that lacked significant manufacturing and construction sectors experience substantially more variation in employment levels. Smith and Borowski (1985) found that areas that specialize in high-tech industries tended to have more pronounced fluctuations than those with little or no high tech industry. In their study of rural counties, Smith and Gibson (1988) determined that diversity does not yield stability.

The second type of research related to the employment stability issue focuses on using establishment characteristics as explanatory variables in analyzing deaths of establishments. For example, Dunne et al. (1989) concluded that while small plants have higher failure rates, if they survive they grow faster than large plants. Large multiple-plant units grow faster and fail less often than large single establishment plants. Howland (1988) was more ambitious: he used both plant characteristics and metropolitan area characteristics to explain plant closures. In the author's own words, "the findings demonstrate little support for the hypothesis that local economic conditions influence plant closures." In his study the only consistently significant variables related to closures were the size of the plant and whether or not the plant was a branch or subsidiary. Large plants were less likely to close than were small plants and branches and subsidiaries were more likely to close than independent establishments.

The third type of study of economic instability uses various economic factors to explain instability and/or plant closures. For example, Gilmer and Pulsipher (1989) investigated the relationship between employment instability and the strong U.S. dollar. They found that the strength of the dollar was not an important determinant of instability. Coelen et al. (1987) on the other hand attempted to explain the migration of firms from one region of the U.S. to another. In essence, they were testing alternative hypotheses about the reasons for firms' migration. Namely, they were trying to determine if firms are forced out of their original site or attracted to their new site. In general, their study supported the hypothesis that plants are forced out of their original site. Typically plants leave areas with high agglomeration economies, high factor costs, and various types of social instability. Baden-Fuller and Longley (1988) developed a model for predicting plant closures in European industry. This was primarily a simulation exercise with relatively little empirical content but it did work reasonably well at predicting plant closures in the petro/chemical industry in Europe. This study is particularly relevant because it points toward the direction that needs to be followed in this country. Specifically, it points toward the need for models to predict plant closings so that business retention and expansion programs can focus their activities on plants that do have a high probability of closing.

In conclusion there is a respectable initial literature dealing with employment instability. However, it is clearly in its infancy, it needs to develop and empirically implement models that focus on the long run stability of employment in plants as a function of both firm characteristics and economic attributes of the communities.

INFORMATION GAPS

What Do We Know About Sustainable Economic Activity?

First, it is generally agreed that for a community to achieve a sustainable level of economic activity it must have a satisfactory level of basic employment. Relatively speaking there is an abundance of information regarding the manufacturing component of a community's economic base. On the other hand, we know very little about how to maintain other components of a community's economic base. In the following sections, some of the major knowledge gaps are identified and suggestions are made concerning research activities that might help bridge those gaps.

1. Manufacturing

Given that so much research in the past 40 years has concentrated on the manufacturing sector, it could be argued that the point of diminishing returns has been reached and that only modest additional resources should be devoted to the study of this sector. First, no additional resources should be devoted to studies of the manufacturing sector that do not disaggregate the manufacturing sector. The literature is abundantly clear that different manufacturing industries have totally different requirements and therefore location determinants. Studies of the aggregate manufacturing sector tend to wash out any significant findings concerning the location determinants of specific industries.

One important area that does deserve additional attention relates to the relationship between a community's labor force and its ability to attract manufacturing activity. Probably the reason that such research has not been forthcoming is because it would involve a detailed knowledge of the labor requirements of different kinds of industry and the ability to measure the potential labor force for very detailed classes of labor in the community. This is clearly a critical piece of information and additional resources should be devoted to it.

Similar issues relate to the role of nonlabor inputs into the industrial location decision. The difficulties associated with other inputs are essentially identical to those encountered in improving the labor input variable. However, it is probably true that considerable potential growth remains in rural manufacturing in industries that utilize resource based inputs. Food processing and secondary wood manufacturing activities are but two examples.

Recreation

For many communities in the Northeast, their best opportunity to increase their economic base is to expand the recreation component of their economic base. As the review of literature above suggested, essentially no information is being generated that would help assess a community's potential for successful recreational activities. Conceptually, the location of recreational activities is not significantly different from the theory of the location of manufacturing or other activities. However, major problems appear to be associated with empirically implementing models that would predict a community's probability of success in the recreational areas. Specifically, it is very difficult to quantify recreational activities. Accordingly, any work

initiated to understand the location of recreation activities must begin with the methodological issues associated with measuring quantity and quality of recreational activities.

3. Services

The literature reviewed above clearly documents that service activities can play an important role in the economic base of rural communities. Fortunately, a considerable complementarity appears to exist between the location of manufacturing activities and the location of service activities. At both the conceptual and empirical level are many similarities and thus studies of the location of service activities can draw heavily on the data bases that have been constructed to study manufacturing activities. Clearly what is required as a first step is a detailed classification of service activities. For example, a restaurant may exist totally to service local clientele or it may exist to service individuals residing outside the community. In the latter case the restaurant may be located at the intersection of interstate highways or it may be located in conjunction with a ski resort. The determinants of the location of that restaurant obviously depend greatly upon which of these clientele it is serving. A separate issue relates to the business service sector which can be both an inducement to new export activity as well as be an export commodity in and of itself.

4. Employment Stability

This topic may be one of the most important and have the highest payoff of any of the issues discussed above. It is an important topic because many rural areas have suffered tremendously from employment instability. It may be an extremely high payoff area both because the literature on which to build is respectable and because of the high degree of complementarity between studies of economic stability and industrial location.

5. Retirement Activities

This topic is rarely mentioned in the literature as a potential contributor to the economic base of rural communities. Normally when we think about retirement communities we think about Florida and Arizona. However, it may be that many rural communities could be successful sites for

moderate size retirement communities. Fortunately, in this area we would have considerable assistance from health care professionals particularly those specializing in gerontology. Staffing requirements for such facilities would be available from these health care specialists and the demand side would rely heavily on demographic characteristics of the residents in the area.

6. Bedroom Communities

Although it is not most communities' first choice as an economic base, it may very well be that significant numbers of rural communities cannot maintain an adequate economic base locally to support their labor force. Their best opportunity may be to focus their attention on methods of improving commuting between their communities and growth centers in the region.

WHAT DO WE KNOW THAT WILL HELP COMMUNITIES ACHIEVE SUSTAINABLE ECONOMIC ACTIVITY?

The answer to this question is this--essentially nothing. Essentially all of the activity in rural development research is focused on the inquiry system section of Bonnen's information system paradigm. Almost no effort is being devoted to the interpretation and analysis component of the paradigm, so we cannot provide information to rural communities that would actually facilitate their decision making process. As was discussed in the introduction to this paper, the land grant system has been very successful in assisting the agricultural sector by developing relevant information systems. It is also true given this experience that the land grant system is uniquely qualified to provide similar services to rural communities. However, the land grant system as currently organized is not providing leadership and the appropriate incentives to develop an information system comparable to that of bygone years. As we see it, organizations such as the Northeast Regional Center for Rural Development and the Center for Rural Pennsylvania are the only ones in a position to provide the leadership and funding necessary to develop such an information system.

Table 1. Summary of Important Location Determinants.

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Study	Study Area	Unit	Plant Characteristics ^a																											
			Energy	Market	Input Availability	Labor Availability	Taxes	Infrastructure	Employment & Industrial Characteristics	Rail Factors & Freight Market	Climate & Public Services	Labor Influence	Population/Demographic Characteristics	Environment	Quality Variables for Regions	Land Cost/Land Size	Transport Services	Corporate Connection	Human Capital	Access to Education	Access to Skills	Local Business Climate	Public Transfer Payments	Private Investment	Time Trade	Firm Size	Health Services			
Walker & Caton ¹	(1990) WV, KY	Plant	X	X																										
Dunne et al. ²	(1989) US	Plant	X																											
Goodstein ³	(1986) AL, KY, TN, NC, VA	County					X	X		X							X		X		X	X								
Borik ²	(1986) US	Small Business					X		X	X	X	X	X				X		X		X	X								
Johnson ²	(1989) NC, SC, GA	Plant					X		X	X	X						X		X		X									
Hawland ²	(1988) US	Plant	X				X			X	X	X					X		X											
Humphrey et al. ³	(1988) US	Director					X																							
McNamara et al. ³	(1988) VA	County/city																X		X										
Smith & Gibson ²	(1988) ID	County								X								X												
Cooper et al. ³	(1987) US	Firm					X		X																					
Khan & Treys ²	(1987) MA	Town					X					X					X													
Mulligan ²	(1987) Southwest	Community																												
Haynes & Mechunda ²	(1987) IN	County								X																				
Brown & Phossant ²	(1987) IN	County																												
Rubin ¹	(1986) IL	City																												
Whelan ²	(1986) US	State					X																							
Moore ²	(1985) US	City										X	X				X													
Borik ²	(1985) US	Plant							X	X	X			X																
Harrington, Jr. ³	(1985) US	County					X	X	X	X				X																
Woylenko & McGuire ²	(1985) US	State					X	X		X	X			X																
Smith ¹	(1984) WI	Business	X				X			X				X						X										
Plaut ²	(1984) TX	Time					X	X		X	X																			
Tickamyer & Duncan ²	(1984) KY	County					X			X																				
Hastings & Goode ²	(1982) PA	Community					X	X																						
Luetch ²	(1979) TN	County						X	X		X	X	X		X															
Green & Schneider ¹	(1980) South	County											X																	
Festorvand & Lumphin ¹	(1980) US	AEDC Member ^a										X	X																	
Schoenman & Sloan ²	(1980) US (27 states)	County																												
Goode ²	(1980) PA	Community					X																							
Bowley ¹	(1980) Canada	Executive Officer							X	X																				
Gilmer & Pulphar ²	(1980) TN-Valley	Community								X																				
Mayerman ²	(1980) US	Bank																												
Vitellano ²	(1980) NY	Hospital																												
Burdett ¹	(1980) US	Corporation								X																				
Fox ²	(1980) TN	Retail Activity								X																				
Taylor & Hirsch ¹	(1980) AK	Customer	X				X	X				X	X					X	X	X										
Smith & Borowski ¹	(1980) KS	Manufacturer																												
Hake et al. ¹	(1980) TN	Firm					X		X	X	X																			
Gilbreth ¹	(1980) CA	Firm																												
Jarvis ¹	(1980) MI	Firm											X	X																
Erenburg & Schulte ¹	(1980) US	Organization																												
Winter ²	(1980) US	Health Service					X																							
Schmitt et al. ¹	(1980) MI	Firm																												
Gilbreth & De Noble ¹	(1980) US	Firm					X	X																						
Cordes ²	(1980) US	Health Service					X																							
Siegner ¹	(1980) CO	Hospital					X																							
Garner & Reblago ¹	(1980) AK	Firm						X																						
McConnell & Schwab ²	(1980) US	Plant							X																					
Deescher et al. ²	(1980) OK	Community					X																							
Cocheba et al. ²	(1980) TN-Valley	Service Unit	X				X																							
Chelt ¹	(1980) US	Plant								X																				
Borik ²	(1980) US	Branch																												

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^aAp, Bsp, Typ, American Economic Development Council Member.
^bStudy based on direct telephone or mail survey.

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